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Conducting independent research is a rite of passage in most PhD programs. Yet, little is known about the factors in the higher educational process that meaningfully shape doctoral students' self-beliefs about conducting independent research. This study used psychosocial and social cognitive variables to predict doctoral students' independent researcher identification and career interest. A total of 129 PhD students enrolled in a single School of Education at a public university in the southeastern United States completed measures of research self-efficacy, mentorship effectiveness, research experience, and stage of degree progress, as well as demographic information and responded to two single item visual analog scales measuring their degree of independent researcher identity and research career interest, respectively.

A multiple regression analysis showed that the study model significantly predicted 42.8% of students' independent researcher identification and to a lesser degree (11.1%) students' research career interest. In the model, research self-efficacy was the sole significant unique contributor to researcher identification thus validating its critical importance for PhD students. Significant differences were observed in participants' researcher identification and research career interest based on stage of degree progress and some or no pre-dissertation research experience. However, no significance was observed for either regarding students' research career interest. The results validate the utility of social cognitive theoretical frameworks with doctoral students, suggests the need for proactive career development models to encourage students' exploration of

research career options, and also that research self-efficacy may be closely related to mentorship effectiveness in helping students to establish independent researcher identification.

EMERGING SCHOLARS: PREDICTORS OF INDEPENDENT RESEARCHER IDENTIFICATION IN EDUCATION PHD STUDENTS

by

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To all of my family past and present, it was your love, support, and heroism that sustained me.

APPROVAL PAGE

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CHAPTER I

INTRODUCTION

Graduate education and doctoral study has a long and esteemed history in the United States (Campbell, Fuller, & Patrick, 2005; Lucas, 1994; Wendler et al., 2010). In fact, the first doctorates, in America, were conferred by Yale University in 1861 (Lucas, 1994). In the United States, a research or professional doctoral degree represents the pinnacle of achievement and knowledge in almost every field of study. In particular, the research-oriented Doctor of Philosophy (PhD) degree and its equivalents (e.g. EdD, etc.) are usually the highest academic degrees conferred by American colleges and universities (Leonard, Becker, & Coate, 2005). Moreover, the number and prestige of doctoral programs helps to elevate the status and classification of higher education institutions (Altbach, 2004):

> In the highly competitive American system, offering graduate and professional degrees is seen as a sign and of prestige and of joining the "big leagues" of research universities. Universities offering the doctoral degree are a reflection of the highly differentiated American system of higher education. Many are among the most prestigious institutions, both public and private, in part because research-oriented universities tend to be at the top of the hierarchy. (p. 4)

In general, the quality of doctoral education provided in United States is considered to be exceptional (Bowen & Rudenstine, 1992). It is an investment that provides dividends and benefits to the world, our nation, academic institutions, and

individual students. First, U.S. doctoral programs are internationally acclaimed (Altbach, 2004; Bowen & Rudenstine, 1992; Wendler et al., 2010). The United States produces the majority of doctorates conferred in the world, and our graduate education system has been known to produce world leaders (Wendler et al., 2010). For instance, to date the Fulbright Foreign Student Program, which enables international graduate students to research and study in the U.S., has produced 20 graduates who went on to become heads of state in their countries of origin (Wendler et al., 2010).

Second, on a national level doctoral students enrich the scholarship and research environment at their academic institutions (Altbach, 2004). At many institutions doctoral students provide a continuous source of labor (i.e., research and teaching assistants) at a modest cost for institutional research and teaching activities while they pursue their degrees. In addition, the innovative research and new scholarship produced in doctoral programs helps our nation to maintain an international competitive position in many research areas (Wendler et al., 2010). According to Wendler et al., "over half of the Nobel Prize winners in chemistry, physics, medicine, and economics had received their graduate degrees in the U.S." (p. 2). In recognition of this, annually a significant amount of private and public research and development funding is given to academic institutions with doctoral programs (Altbach, 2004; Wendler et al., 2010). Finally, doctoral programs especially those that are research-based produce most of the individuals who enter the professoriate and become future academic leaders (Altbach, 2004; Bowen & Rudenstine, 1992; Wendler et al., 2010).

For individuals, doctoral education has several professional and personal benefits (Komives & Taub, 2000). In their course of study, doctoral students acquire the skills and knowledge that accords them the status of an academic professional (Adler & Adler, 2005); as graduates they have obtained credentials that allow them to aspire to the highest ranks of their professions (Komives & Taub, 2000). There are also financial advantages to pursuing a doctorate as earnings typically increase with level of educational attainment (Cheeseman Day & Newburger, 2002). According to a 2002 U.S. Census Bureau report, a bachelor's degree increased an individual's work-life earnings by 62% and a graduate degree by an additional 21% (Cheeseman Day & Newburger, 2002). Moreover, it was reported that a terminal degree, such as the PhD resulted in higher earnings over a lifetime. More recent data (Kantrowitz, 2007) showed an increase in previous figures. According to Kantrowitz, a bachelor's degree will earn an individual an average of $1.2 million over a high school diploma and a doctoral degree holder will earn $1.7 million more over someone with only a bachelor's. Taken together, the international, national, institutional, and individual merits and benefits derived from doctoral education emphasizes the continued value of doctoral education in American society (Altbach, 2004; Golde, 2006; Wendler et al., 2010).

Over its long history the American doctoral education system has provided a big return on its investments. As previously mentioned it provides prominence for institutions, financial benefit for degree holders, and is deemed to be very successful for all stakeholders (Altbach, 2004; Golde, 2006). Furthermore, in the past century, it has seen monumental growth and expansion (Altbach, 2004; Bowen & Rudenstine, 1992;

Golde, 2006). The numbers of doctoral degree recipients have increased significantly. For example, in the late 1870's, the number of PhD's graduating each year was estimated to be around 40; by 1900 estimates had risen to about 300; by 1925 there were an estimated 1,200 persons; and by the mid-1970's it reached a plateau of an estimated 33,000 graduates (National Research Council, 1978). In 2008, U.S. higher education institutions awarded 48,802 research doctorate degrees, which represented an increase of 1.4% over 2007 and the sixth year of consecutive increases. Moreover, it was the highest number awarded to date, as reported by the U.S. Census Bureau's *Survey of Earned Doctorates,* which has been monitoring trends since 1958 (Census Bureau, 2010).

However, in more recent times overall growth is slowing in some fields of study. The National Science Foundation (NSF) published single year (2007-2008) and ten year (1998-2008) statistical trends, showing disparate growth between disciplines, for research doctoral degrees awarded in two general categories: science and engineering degrees (i.e., Life Sciences, Physical Sciences, Social Sciences, Mathematics and all Engineering fields) and non-science and engineering (i.e., Education, Health, Humanities, and Professional fields) (Fiegener, 2009). According to the NSF, in 2008, 48,802 research doctorate degrees were awarded. Again, this was an overall increase of 1.4% over the previous year, but it was also the smallest annual increase over the last six years (Fiegener, 2009). Overall growth, in the number of degrees awarded that year, was attributable only to science and engineering fields of study. Specifically, between 2007 and 2008, a total of 32,827 (67.3%) degrees were awarded in science and engineering. This was an annual increase of 3.2 % and also an increase of 20.4% over a decade. In

contrast, degrees awarded in non-science and engineering fields, in the same time period, totaled 15,975 which was actually a decrease of 2.1% from the previous year and only a 4.0% increase over the last ten years. So although the numbers of doctoral graduates have been increasing, actually there has been a net decrease in growth over the last ten years and overall degree completion has slowed (Fiegener, 2009).

In the last decade, the declining rate of growth in students in some disciplines has focused attention and criticism on the traditional emphasis, practices, and outcomes of the current doctoral education system (Altbach, 2004; Bowen & Rudenstine, 1992; Council of Graduate Schools, 2008, 2010; Golde, 2006; Golde & Dore, 2001; Lovitts & Nelson, 2000; Nyquist & Woodford, 2000). Additionally, the increasing global market demand for advanced education (McAlpine & Norton, 2006; Wendler et al., 2010), expectation of doctoral training for professional advancement (Komives & Taub, 2000), coupled with the attrition and time to degree challenges in doctoral education (Bowen & Rudenstine, 1992; Golde, 2000; Lovitts & Nelson, 2000) has sparked interest and correspondingly numerous research studies (Baird, 1990; Bowen & Rudenstine, 1992; Golde & Dore, 2001; Lovitts & Nelson, 2000) and national commission assessments of doctoral study (e.g., Council of Graduate Schools, 2008, 2010), many with the goal of highlighting the contemporary issues, challenges, and barriers inhibiting doctoral study interest and doctoral student completion.

In the social sciences, the research literature has emphasized the professional socialization processes (Weidman & Stein, 2003) and specific skills and scholarly behaviors (Gardner, Hayes, & Neider, 2007; Gardner, 2008a; Golde, 2006; Golde &

Dore, 2001; Lovitts, 2005, 2008) that externally signal to faculty mentors and academic departments the transformation of students into scholars and researchers (Bieber & Worley, 2006; Boote & Biele, 2005; McAlpine & Norton, 2006). Interestingly, within education fields of study these skills and behaviors are made more difficult to differentiate by the existence of dual and sometimes competing terminal research based degrees—the EdD and the PhD—and ongoing debates about education's classification status in academia as a discipline versus a profession (Baez, 2002; Gardner et al., 2007; Richardson, 2006).

Some of the justification for dual degree tracks has centered on using the degrees to differentiate between individuals who want to gain skills as researchers and those who want to enhance their knowledge as practitioners (Baez, 2002; Gardner, et al., 2007). Throughout much of the literature and discourse on the topic, an often proposed distinguishing standard has been that the PhD degree should be reserved for the purpose of developing students who want to become researchers and are interested in full-time academic research and teaching careers (Baez, 2002; Gardner et al., 2007). But even with two degrees to guide students' intentions, an inquiry into the researcher self-perceptions of PhD doctoral students is critical to examine across the education discipline. For instance, Richardson (2006) argues that in education doctoral programs an epistemic identity is most important for students to claim and develop because unlike other fields, education students often are both learners and purveyors of the education enterprise. She suggests that this double consciousness may be a defining and complicating characteristic of the PhD degree in education—by this reasoning as graduates, education PhD students

become stewards for the field of study and also are responsible the effectiveness of the enterprise as a whole (Golde, 2006).

The remainder of this chapter briefly describes current graduate enrollment trends and discusses some of the background issues, challenges, and barriers identified across disciplines in the research literature on doctoral study. That is followed by a statement of the problem and the significance of the study. Finally, I conclude the chapter by articulating the study purpose and research questions.

Graduate Education: Issues, Challenges, and Barriers

Despite the degree attainment numbers cited earlier and the stated merits and benefits of an advanced degree, the majority of undergraduates do not pursue graduate study and earning a PhD has been the goal of only a small percentage of Americans. Wendler et al. (2010) reported that, whereas there have been slight increases over the last decade in graduate enrollments, only an estimated one-quarter of students (1992-1993) who received bachelor's degrees, the prerequisite for graduate school, had earned either a master's or doctorate degree ten years later. Furthermore, of that 25% of students only 2% had earned doctoral degrees (Bradburn, Nevill, Cataldi & Perry, 2006). The average time between obtaining an undergraduate degree and entering doctoral study was previously reported to have reached an all-time high of 10.5 years (Ferrer de Valero, 2001). Moreover, in the education discipline, which is the population of interest in this study, the median number of years to the doctorate from a bachelor's in 2000 was reported to be 19.6 years (Maher, Ford, & Thompson, 2004). Once students enrolled, other trends reported also included: higher percentages of women than men, but women

still predominantly enroll in traditional fields (e.g., education) and small increases for minority groups, but minority student figures continue to fall below each group's representation in the U.S. population (Council of Graduate Schools, 2008, 2010; Denecke, 2006; Wendler et al., 2010).

Challenges such as flat graduate enrollments in some disciplines, relatively small numbers of U.S. doctorates overall, as compared to previous decades, and continued underrepresentation of women and racial and ethnic minorities in science and engineering fields, are further compounded by the dual issues of extended time-to-degree and high attrition rates in many doctoral programs (Altbach, 2004; Baird, 1990; Bowen & Rudenstine, 1992; Ferrer de Valero, 2001; Golde, 1998; Lovitts & Nelson, 2000). The time-to-degree once enrolled also has been increasing over the last ten years (Altbach, 2004; Ferrer de Valero, 2001; Wendler et al., 2010). For instance, in 2001, Ferrer de Valero reported that nationally the trend went from an average of 6.6 to 7.1 years for doctoral degree completion. Three years later, Altbach (2004, p. 4) asserted "the time-to-degree in the traditional arts and sciences fields has been increasing to almost nine years in the humanities and six years in the life sciences." Finally, according to a recent news article, the average time to degree is approximately 7.7 years and moreover 30 percent of all entering doctoral students fail to complete their degrees (Glenn, 2010).

Some researchers (Golde, 2000; Maher et al., 2004; Nyquist & Woodford, 2000) argue that extremely talented individuals are the ones leaving doctoral study in the highest percentages. Therefore, the increasingly large numbers of doctoral students who are non-completers or who are suspended in ABD (all but dissertation) status have been

declared to be a national loss of talent (Anderson & Swayze, 1998; Lovitts & Nelson, 2000; Maher et al., 2004; Wendler et al., 2010). In fact, completion rates averaging about 50% in some fields have been cited by researchers (Bowen & Rudenstine, 1992; Gardner, 2009a; McAlpine & Norton, 2006) as indicative of a national attrition-related crisis in doctoral education (Council of Graduate Schools, 2008, 2010; Gardner, 2009a; Golde, 2005; Nettles & Millett, 2006).

Moreover, the decision to leave graduate study typically occurs after several years of effort, time, and money spent in pursuit of the degree (Golde, 2005, 2006). High attrition is problematic because it dissuades prospective students from pursuing advanced degrees and wastes limited institutional financial resources (Fisher & Zigmond, 1998). Furthermore, researchers (Golde, 1998, 2005) argue that doctoral student attrition has detrimental economic and non-economic costs. Golde (2005) articulated economic costs such as un-recoupable monies spent on stipends, especially in the case of late stage attrition; and non-economic costs such as loss of faculty productivity and shortages of graduates for teaching and research.

Since it has been determined that attrition in doctoral programs "is not discipline specific" (Lovitts & Nelson, 2000, p. 1), the alarm has been sounded on doctoral education across all disciplines in the United States. The most current data on the attrition problem is from the *Ph.D. Completion Project*, which was initiated by the Council of Graduate Schools (CGS) and was designed to collect comprehensive data on doctoral student attrition and completion as well as to identify areas and strategies for improvement (CGS, 2008, 2010). Spanning a seven year time period (2003 through

2010), this CGS initiative was launched to collect cohort level data and outcomes related information on over 50,000 students from 400 programs at 29 funded institutions and 25 additional partner institutions (CGS, 2010; Denecke, 2006). Doctoral students in the project were broken down into three cohort groups of students entering doctoral study in the years from 1992-93 through 2000-01 (Siegel, 2008).

Baseline data collected in 2004 (Denecke, 2006) and organized by the broad field categories of Life Sciences, Physical Sciences, Social Sciences, and Humanities denoted large disparities in completion rates across disciplines. For example, 2004 CGS data reported estimated completion percentage ranges, by discipline, to vary from 67- 75% in the Life Sciences; 60-71% in the Physical Sciences; 55-59% in the Social Sciences; and 33-50% in the Humanities. Moreover, higher completion rates were reported for men versus women, majority versus underrepresented students and international versus domestic students (Denecke, 2006). Four years later (Siegel, 2008), data for 9,500 students in Cohort A (matriculates for years 1992-93, 1993-94, and 1994-95) denoted an overall ten year completion rate of 57% for this first cohort of the study. Furthermore, the completion data across four broad field discipline categories were: 63-64 % in Engineering and Life sciences, 55-56% in Mathematics/Physical Sciences and Social Sciences, and 49% in Humanities. Male and female completion rates were similar to the 2004 figures. Also notable was that 10 year completion rates were stabilized in Science, Technology, Engineering, and Mathematics (STEM) fields but not in the Humanities and Social Sciences.

There are numerous personal variables that can severely delay the doctoral process and exacerbate the time to degree problem. These include, but are not limited to: demographics, financial support, motivation, and ability (Ferrer de Valero, 2001). These are factors usually inherent to the individual students. However, over time, research has shown that both personal and institutional factors interact to hinder timely completion of the doctoral degree (Baird, 1990; Ferrer de Valero, 2001). For example, research by Baird (1990) suggested that departmental practices and policies were an equal if not greater source of hindrance than personal variables or individual attributes. Baird found that students in the natural sciences and technical fields complete faster than students in the social sciences. These disparities, by disciplines, have been attributed to differences in requirements mainly the dissertation for social sciences with multiple research paradigms versus the centrality of a specific paradigm for the hard science disciplines (Baird, 1990; Nettles & Millet, 2006). Furthermore, differences in procedural characteristics and research learning environment, by discipline, were also mediating factors (Ferrer de Valero, 2001). For example, in the hard sciences research is carried out under the daily guidance of the mentor or faculty. In the social sciences students may conduct their research alone and only intermittently consult with their mentors.

Research (Ali & Kohun, 2006; Golde, 2000, 2005; Lovitts & Nelson, 2000; Tinto, 1993) has shown that there are common intrinsic and extrinsic factors that can create issues, challenges, and barriers leading to the high attrition and low completion rates of our nation's doctoral students. Lovitts and Nelson (2000) contended that there were several general problems at work in the current state of doctoral education. First, there

were problems with climate and fit—students did not understand the academic culture of institutions and departments. Lovitts and Nelson argued that in many cases, students were not sufficiently integrated into the academic community upon entering their program. Second, there were problems with appropriate levels of student financial support—students with no financial support often had low participation and were the most vulnerable for dropping out. Third, the researchers felt that many departments treated students poorly, appeared indifferent, and often did not convey necessary information regarding the culture and academic expectations for the program. Fourth, according to Lovitts and Nelson (2000), faculty members were too passive in regards to the student's experience. For example, they argued that faculty advisors did not mentor students properly, and were frequently ineffective because they did not take an active interest in graduate students' psychosocial needs. Lovitts and Nelson's contention of the passive role of faculty was consistent with a previous qualitative study by Baird (1990), who found that lack of interest and effectiveness, on the part of faculty, were key factors in students' departure from programs across disciplines. The similarity of both findings, ten years apart, suggests that continued attention must be given to the effectiveness of the mentoring relationship and its role in the academic and the social experiences of doctoral students.

Reasons for departure also vary by discipline. Golde (1998), using qualitative methods examined attrition in students (n = 58) in science fields (geology and biology) and humanities (history and English). Golde found students' reasons for leaving differed significantly by discipline—science versus humanities. In the sciences students reported

leaving due to department and institutional factors; their prospects in the job market; and mismatch with their advisor or mentor. In the humanities, students reported leaving due to too much emphasis on theory in coursework; determination of their unsuitability to the profession of study; and lack of prior realization of the degree's emphasis on research. The latter reason underscores the value of understanding what helps students to develop and advance research skills, across disciplines, in doctoral education.

Overwhelmingly, to counter extended time to degree and attrition, researchers emphasize better integration into the program and field of study (Golde, 2000; Lovitts & Nelson, 2000; Tinto, 1993), early exposure to research (Golde & Dore, 2001; Lovitts, 2008) and developing a sense of community (Ali & Kohun, 2006; Lovitts, 2001; Stalker, 1991) as factors important to graduate and doctoral student retention. For example, in accordance with Tinto's (1993) attrition theory, Lovitts and Nelson (2000) asserted that "a student who enters a department whose culture and structure facilitate academic and personal integration is more likely to complete the Ph.D." (p. 4). Moreover, this stance is supported by the vast amount of literature identifying socialization as the most common solution for mediating attrition across disciplines and for facilitating students' professional transitions (Bowen & Rudenstine, 1992; Gardner, 2008b; Golde, 1998, 2005; Lovitts & Nelson, 2000).

The increasing time-to-degree, high attrition in some disciplines, and varying degrees of socialization to scholarship and research, support the need for studies that examine the potential contextual and empirical factors that contribute to the successful training, retention, and degree completion of doctoral students in the United States

(McAlpine & Norton, 2006). In particular, it may be critical to validate the experiences through which doctoral students are best developed to become scholars and researchers (Boote & Biele, 2005) across different disciplines and identify at which stages of doctoral study it is optimal to provide them. Doing so will help educators to develop a better understanding of how doctoral students gain valuable heuristic knowledge (Padilla, 1999) about how to conduct independent research in their various disciplines and throughout the process of doctoral study (Gardner, 2008a; Lovitts, 2005, 2008).

Until now, much research and literary attention has been paid to the role of environmental conditions (e.g., Bowen & Rudenstine, 1992; Golde, 2000; Lovitts & Nelson, 2000), students' demographic and background characteristics (Gardner, 2008a; Lovitts, 2001), amount of program or department socialization (Weidman, Twale, & Stein, 2001; Weidman & Stein, 2003), the structure of institutions and academic processes (Golde & Dore, 2001; Sheppard, Nayyar, & Summer, 2000; Weidman & Stein, 2003), and degree completion outcomes (Council of Graduate Schools, 2010) in doctoral education. Wendler et al. (2010) collectively referred to these foci as primarily describing the inputs and outputs to the system. By far, less research exists on what happens in between matriculation and graduation and on delineating the factors at work in aiding the most critical transitions during doctoral study (Gardner, 2009b). In order to ameliorate this gap in the literature, Bieber and Worley (2006) argued for increased research that provides "insights into how students themselves experience graduate school" (p. 1010).

Research is arguably the historical and primary emphasis of the PhD degree (Berelson, 1960). Nationally, the stated and implied traditional purpose of the Doctor of

Philosophy degree is the development of academic and professional independent researchers (Gardner, 2008a; Lovitts, 2005, 2008). Given Gardner's assertion that "independent scholarship is therefore part and parcel of the socialization process in doctoral education, because it is what defines the degree and its potential recipient" (Gardner, 2009b, p. 329), one might reasonably conclude—that the development of a strong identification as an academic scholar or a professional researcher – is a natural outcome of the doctoral student experience. However, actual research (Golde & Dore, 2001) has found disparate results in this arena across disciplines and programs. As a result, contemporary scholars have been turning their attention to examining the factors and processes that are believed to transition students from knowledge consumers to knowledge producers (Gardner, 2009a; Golde, 2006; Lovitts, 2005, 2008). So, while the previous literature on doctoral study placed an emphasis on reporting student outcomes, the focus now is shifting to understanding the mediating variables involved in acculturating and empowering students to become independent scholars (Bieber & Worley, 2006; Gardner, 2008a; Golde & Dore, 2001; Lovitts, 2001, 2005).

Increasingly, scholars are becoming more interested in how doctoral programs are preparing students to become independent researchers (Gardner, 2008a; Golde, 2006; Golde & Dore, 2001; Lovitts, 2005, 2008). Henkel (2005) argued that doctoral and post-doctoral studies were most responsible for how individuals developed their research agendas, areas of specialization, and established an "epistemic identity" (p. 167). Therefore, it is important for educators to understand how various aspects of the institutional, program, and professional environment interact to influence educational and

career choices (Lent & Hackett, 1987) such as doctoral students' career interest and development as independent scholars (Boote & Biele, 2005; Gardner, 2008b; Golde, 2006; Golde & Dore, 2001). This task, within doctoral education, is challenging because the depth and scope of research training and experience varies greatly by discipline (Golde & Dore, 2001).

Despite the emphasis on research in PhD programs, educational professionals have limited understanding of the social and structural components in which strong research interest, identification, and convictions are meaningfully shaped (Golde & Dore, 2001), and previous findings have shown that overall for students "research training is not comprehensive and students are not well informed about all aspects of research" (p. 13) during doctoral study. Thus, gaining an increased understanding of the processes that contribute to the social and cognitive development of an independent researcher in doctoral study may lead to the development of strategies that may attenuate ABD and better assist students in completing their degrees.

In sum, the cognitive development of research skills and independent research productivity are goals common to many disciplines of doctoral education (Boote & Biele, 2005; Gardner, 2008a; Golde & Dore, 2001; Lovitts, 2005, 2008). As such, this study uses Social Cognitive Theory (Bandura, 1986) as a conceptual framework to investigate the relationship between the selected socio-cognitive variables of research self-efficacy, mentoring effectiveness, and research experience, and doctoral students' self-beliefs about themselves as academic and professional researchers. Additionally, the study will

explore the relationship between students' researcher identity convictions and their research-career interests.

Statement of the Problem

The previous section introduced some of the current research on issues that lead to attrition and non-completion in doctoral education. As previously mentioned, much of the research on doctoral education can be characterized by a focus on programmatic and disciplinary shortcomings (e.g., degree requirements and time to degree) or socialization issues that result from extant environmental conditions of departments and institutions (Lovitts & Nelson, 2000; Maher et al., 2004; Tinto, 1993; Weidman et al., 2001; Weidman & Stein, 2003). Although these areas remain important to student retention and success, less understood are the complex socio-cognitive beliefs and psychosocial developmental processes of doctoral students, especially in their identity transition in becoming independent researchers (Gardner, 2008a; Golde, 2006; Golde & Dore, 2001; Lovitts, 2008).

Furthermore, researchers have asserted that "despite decades of attention the mismatch between the purpose of doctoral education, aspirations of students and the realities of their careers-within and outside academia continues" (Golde & Dore, 2001, p. 5). As such, the 2010 Council of Graduate Schools Executive Summary report provided recommendations and best practices, gathered from the seven year project on PhD attrition and completion. The project final report emphasized that it was important to understand factors that facilitate or constrain the effectiveness of doctoral programs for different groups of students (Maher et al., 2004).

Specifically, the CGS report revealed six institutional and programmatic critical areas for improvement and intervention in doctoral education. These were: (a) selection and admissions, (b) mentoring and advising, (c) financial support, (d) research mode of the field, (e) curricular and administrative processes and procedures, and (f) program environment (Council of Graduate Schools, 2010). This study will examine the socio-cognitive and psychosocial student development factors related to at least two of the six CGS critical areas, mentoring and advising and the research mode of the field to better understand the potential variables that most contribute to the development of independent researcher identification in doctoral students.

Unfortunately, traditional student development theories have overlooked the experience of doctoral students and theories on doctoral students' socio-cognitive development are limited (Gardner, 2009b; Golde, 2006; McAlpine & Norton, 2006). The paucity of theoretical frameworks for doctoral students was the genesis for my research interest in understanding the factors and characteristics that promote and support doctoral students' academic identity and career choice. Specifically, this study aims to examine the role of four hypothesized variables: (a) stage of degree progress (SDP), (b) perceptions of research self-efficacy (RSE), (c) perceptions of mentoring effectiveness (ME), and (d) research experience (RE) in predicting doctoral students' perceptions of themselves as independent researchers and the relationship between their self identification and career choice.

Significance of the Study

Doctoral degrees are classified three ways: (a) Professional degrees exist in fields such as medicine (MD) and law (JD); (b) applied degrees in fields such as public health (DPH) and education (EdD); and (c) the research oriented Doctor of Philosophy (PhD) degree awarded across multiple fields of study. These degrees also vary by purpose and career goals. The professional doctorates are practitioner focused and most do not have an original research requirement for completion. Although applied doctorates may conduct research, it is typically in a specific context relevant to the respective field (The University of Texas System, 2007). Conversely, the purpose of the PhD and other research-based doctoral degrees is the preparation of scholar-researchers whose skills as independent researchers may be applied in various academic and non-academic settings (Altbach, 2004; Berelson, 1960; Golde & Dore, 2001). Therefore, this study's focus is on doctoral students enrolled in PhD programs because the degree's traditional purpose has been the preparation of professional and academic researchers.

Recently, researchers have begun to argue for the need for broader technical skills and more generalized training in all types of doctoral education (Campbell et al., 2005), but arguably research preparation remains the predominant paradigm and narrowly tailored focus of the doctoral degree (Altbach, 2004; Berelson, 1960, Bieber & Worley, 2006; Golde & Dore, 2001). By far, the established cultural practice of doctoral programs has been to prepare students to become scholars and researchers of their respective fields and professions (Altbach, 2004; Berelson, 1960; Bieber & Worley, 2006; Boote & Biele,

2005; Golde & Dore, 2001). Berelson (1960) noted how the research emphasis, in doctoral education, has been debated over the evolution of graduate education:

> Coupled with the role of science is the position of research, the activity that quickly became the *raison d'etre* of graduate study and still is, despite decades of criticism from those concerned about the preparation of college teachers. The demands of research and training for research, culminating in the doctoral dissertation, have been at the heart of controversies about graduate study from the start. (p. 12)

Thus, the implication of awarding the PhD degree is that its graduates are individuals who are thoroughly "steeped in the world of research" (Bieber & Worley, 2006, p. 1009) and who will pursue careers in academic or other research-related fields (Golde & Dore, 2001). Although research productivity has traditionally been a core expectation of doctoral students, exposure and relevant opportunities for research are not universal doctoral student experiences. In fact, significant differences exist in the amount of research exposure, quality of training experiences, and career outcomes across disciplines (Golde & Dore, 2001). This may be impacting outcomes as researchers (Altbach, 2004; Golde & Dore, 2001; Bieber & Worley, 2006) have asserted that there is a growing "disjunction" (Altbach, 2004, p. 4) between the PhD's original purpose—expertise in research and the experience—and actual degree use by graduates. This is critical considering the valuable roles that researchers perform within our society. Studies have found that research training practices while common across doctoral programs are implemented differently across disciplines and departments (Golde, 2006). The academic department is where the primary development of students as researchers is

believed to occur (Henkel, 2005). Therefore, the effectiveness of doctoral programs in facilitating the development of students' researcher identity—defined as their commitment, convictions, and self-perceptions as independent scholars and researchers capable of generating original scholarship (Bowen & Rudenstein, 1992), could be an important factor in students' persistence to degree and may contribute to the likelihood of them selecting professional research as a career choice.

Furthermore, critics of conventional practices in doctoral education (Golde, 2006) argue specifically that although research generation is the traditional purpose of the PhD, shortcomings result because "we often do not deliberately consider or explicitly articulate our theories and strategies on the pedagogy of research for developing excellent researchers" (p. 14). Thus, the delineation of the social and cognitive factors, in doctoral education, which most effectively facilitate or impede doctoral students' development and self-perceptions as independent researchers across various fields of study may contribute to a better understanding of how to successfully nurture doctoral students to become enduring stewards of the profession (Golde, 2006), and better develop them as academic and professional researchers (Gardner, 2008a; Lovitts, 2005).

The results obtained from the study could provide information that may aid graduate program faculty and administrators in strategically planning and designing more effective learning environments to better prepare and empower current and prospective PhD students to be researchers. In addition it may offer strategies to ensure a better match between students' expectations of doctoral education and students' career goals. Finally, this study may also have implications for practice such as ramifications for what should

be emphasized in doctoral education and identify strategies to use with students to reduce time to degree and ABD status, increase degree completion, and develop them as independent researchers.

Definition of Terms

All But Dissertation (ABD). Students who have completed all of the necessary coursework for their degree or who have completed all of the requirements for the degree except the dissertation.

Research self-efficacy (RSE). "The extent to which students are confident about carrying out different research tasks, from the library research to designing and implementing practice research projects" (Holden, Barker, Meenaghan, & Rosenberg, 1999, p. 464).

Research experience (RE). A phrase denoting students' exposure and hands on experiences with research, prior to the dissertation, and including experiences gathered on the undergraduate and master's levels. These experiences include selecting a topic, collecting and analyzing date, and disseminating results.

Stage of degree progress (SDP). Tinto's (1993) three stages of the process of doctoral student persistence: transition (stage one), years up to candidacy (stage two), and from candidacy to dissertation defense (stage three).

Mentoring effectiveness (ME). Behavioral characteristics and responsibilities of mentors that contribute to a successful mentoring relationship (Berk, Berg, Mortimer, Walton-Moss, & Yeo, 2005).

Researcher identity (RI). Students' self-identification, self-beliefs and personal conviction of themselves as independent scholars and researchers capable of generating and producing original and creative scholarship (Bowen & Rudenstein, 1992). Having high confidence in one's ability to independently conduct research and create knowledge in their disciplines (Gardner, 2008a; Gardner et al., 2007; Lovitts, 2005).

Purpose and Research Questions

The purpose of this study was to examine the collective and independent role of four hypothesized variables: (a) stage of degree progress (SDP), (b) perceptions of research self-efficacy (RSE), (c) perceptions of mentoring effectiveness (ME), and (d) research experience (RE) in predicting doctoral students, enrolled in one School of Education, perceptions of themselves as independent researchers. A secondary purpose was to investigate the extent of the relationship between the students' independent researcher identification and their future research-related career interests. The study answered the following research questions:

1. Is there a significant relationship between levels of researcher self-efficacy, mentoring effectiveness, stage of degree progress, and research experience and doctoral students' self-identification as independent researchers?
2. How much of the variance in independent researcher identification in doctoral students, in the School of Education's PhD programs, is accounted for by each of these variables? Which of these variables is a better predictor of independent researcher identity in these students?

3. Is there a significant relationship between self-ratings of independent researcher identity and reported research career interests?
4. Do the researcher mean identity rating patterns and research career interests of doctoral students differ significantly by research experience and stage of degree progress?

CHAPTER II

LITERATURE REVIEW

This chapter presents a review of the related literature organized into three sections. In the first section, three higher education approaches: adult development, adult learning, and professional socialization models are discussed regarding their application to the educational and developmental experiences of graduate and doctoral students. The second section gives an overview of a recently developed model tailored to doctoral student psychosocial development and uses this model to ground the study's four variables. Specifically, the related research literature on four study independent variables: stage of degree progress, research self-efficacy, mentoring effectiveness, and research experience are discussed for their role in students' learning and socialization experiences in doctoral education.

In the third and last section, social cognitive theory (Bandura, 1977, 1986) and the interrelated social cognitive career theory (Lent, Brown, & Hackett, 1994) are presented as the study's conceptual framework used to examine the relationship between students' high or low researcher identity convictions and students' reported degree of interest in research-oriented careers and conducting post-graduate research.

Doctoral Student Development

Throughout higher education theories provide useful lenses for viewing the psychosocial, cognitive-structural, and social identity development of individuals

(McEwen, 2005). As a result, there are numerous and well documented student development theories (McEwen, 2005) that delineate patterns of undergraduate students': stages of adolescence (Erikson, 1968); psychosocial development during the college years (Chickering & Reisser, 1993); major life events and transitions on the way to becoming adults (Arnett, 2004; Goodman, Schlossberg, & Anderson, 2006); and their intellectual and cognitive growth (Baxter Magolda, 1992; Perry, 1998). Collectively, these extant development theories have been used to explain the stages and processes of growth and change in traditional adolescent student populations, especially during the undergraduate collegiate years (Evans, Forney, Guido, Renn, & Patton, 2010; King, 2005), almost exclusively and were not inclusive of doctoral students experiences (Gardner, 2009b).

In contrast to the plethora of development theories for traditional aged undergraduates, graduate students are already considered to be fully developed as adults (Hoare, 2006) and thereby, discourse about their development has been somewhat limited to the contexts of three interrelated theories: adult development (Levinson, 1986), which is considered to be relatively new concept (Gardner, 2009b; Hoare, 2006; McEwen, 2005); adult learning (Knowles, 1968); and more recently, professional socialization models (Weidman et al., 2001; Weidman & Stein, 2003). The following section discusses these three approaches and highlights the strengths and weaknesses of each when applied to the psychosocial and advanced cognitive development needs of doctoral students.

Adult Development, Adult Learning, Professional Socialization, and Doctoral Study

Hoare (2006) defined adult development as "systematic, qualitative changes in human abilities and behaviors as a result of interactions between internal and external environments" (p. 8). Originating from the life-span theory developed by Erikson (1959), Levinson (1986) posited a cohesive theory on the nature of adulthood consisting of the development processes that take place over what he identified as an individual's life course, life cycle, and life structure; all of which provide the framework for his "conception of adult development" (p. 3). Levinson (1986) discussed six major issues related to conceptualizing how an adult's social and physical environment can impact their development. The issues also encompassed ways for delineating the various structural periods (seasons) of adult life based on age-related transitions and cognitions. Furthermore, the theory was posited to integrate the developmental and socialization perspectives on adulthood (Levinson, 1986).

Contemplation of the six issues led Levinson to identify six age-structured transitional stages of adulthood: early adult transition (ages 17-20 years), entering the adult world (ages 22-28 years); age 30 transition (ages 28-33 years); settling down (ages 33-40 years); midlife transition (ages 40-45 years); and entering middle adulthood (ages 45-50 years) (Levinson, 1986, 1990). To describe each briefly: during early adult transition individuals are departing adolescence; entering the adult world is marked by major life decisions about career, family and personal values; age thirty transition is a period usually marked by major life structure changes. During settling down the individual assumes increased responsibilities for themselves and others if they have

become parents; in midlife transition the individual reflects on their life purpose and may experience crisis; and finally entering middle adulthood is the time when commitments to ones values and life choices occurs.

In her diagram of the relationships among various theories about the development of college students, McEwen (2005) overlaps adult development with the family of psychosocial development theories, which consists of other psychologically based theories about college students. This can be attributed to her description of psychosocial theories as concerned with the "major issues that students think about and what they are preoccupied with" (p. 13). Furthermore, McEwen's placement of adult development as a psychosocial theory seems appropriate because doctoral students typically begin pursuit of their degree at ages characterized by Levinson's entering the adult world through the entering middle adulthood stages. As such, the life tasks consistent with these stages (i.e., marriage, children, and career building) often become competing issues and challenges that doctoral students must manage in addition to their education (Maher et al., 2004; McAlpine & Norton, 2006). This is further supported by the significant relationship between adult development and adult learning, in that adult learning is considered by many to be a key process of adult development (Hoare, 2006). Therefore, an individual's inabilities to negotiate the competing demands of family commitments, financial resource needs, and career obligations while pursuing doctoral education may be contributing to the aforementioned protracted time to degree and escalating attrition rates, especially in women doctoral candidates (Maher et al., 2004; McAlpine & Norton, 2006).

Hoare (2006) defined adult learning as "a change in behavior, a gain in knowledge or skills, and an alteration or restructuring of prior knowledge" (p. 8). Merriam (2001) asserted that educating adults is significantly different from educating non-adults. Evidence supporting this can be found in early adult learning theories, which were differentiated by a focus on adult learning styles and corresponding learning approaches that were posited to be diametrically opposite from pedagogical approaches used with children and adolescents (Knowles, 1968; Merriam, 2001). One of the most well-known theories of adult learning is the theory of andragogy, which was developed by Knowles (1968) to counter the leading focus on pedagogy in adult education during the late 1960's and early 1970's.

Andragogy focuses on five assumptions regarding adult learning styles: adults are independent and self-directed learners; adults require learning to be relevant; adult learning is optimized by a transition and role changes; adult learning is best achieved by completion of a specific task or solving problems; and adults' motivation to learn is more intrinsic than extrinsic (Knowles, 1968; Merriam, 2001). Most significantly, the theory of andragogy advocated a period paradigm shift from teacher-centered to learner-centered approaches and from directed to more facilitated learning (Herod, 2003; Merriam, 2001). Facilitated learning collectively refers to adult learning approaches that utilize methods designed to be self-directed, transformative, experiential, and highly contextualized (Herod, 2003).

On its face, andragogy's theoretical conceptualization of adult learning styles and corresponding adult learning methods seem to fit well with doctoral study expectations

and practices. In particular, the five assumptions and facilitated learning approaches appear consistent with many of the post-coursework and transitional experiences of doctoral students. For example, Lovitts (2005) argues that doctoral students must transition from a pre-adult directed learning experience dominated by course-taking and knowledge consumption to that of a self-directed "independent scholar/researcher (a producer of knowledge that often results from uncertain processes that take place in unstructured contexts)" (p. 138).

Furthermore, Lovitts posits that doctoral education can be divided into a dependent and independent stage. In the dependent stage students' chief task is to master the knowledge of their field primarily through coursework (pedagogy). In science disciplines the dependent stage also includes research conducted under close supervision (contextualized learning). In contrast, the independent stage expects students to create their own views on knowledge by conducting original research (experiential learning). Lovitts further contended that at this advanced stage, autonomous and independent work (self-directed learning) is the expectation of students in most doctoral disciplines.

However, an important criticism of andragogy, as a theory, is that it may oversimplify the complexity of learning that occurs in doctoral education. Throughout the literature, an overarching critique of theory is that it is inherently a reductionist tool (King, 2005; McEwen, 2005). Such claims are based on the fact that one theory alone cannot account for the universe of experiences unique to any individual. Therefore, it is not surprising that major critiques of andragogy theory stemmed from its attempt to provide a unified structure to adult learning by reducing the process to simplistic

assumptions (Hartree, 1984). In doctoral study this is further compounded by the huge diversity of backgrounds, large numbers of students, and heterogeneity of doctoral students today (Gardner, 2009b). For example, Hartree (1984) challenged that andragogy was misrepresented as a learning theory and instead was more accurately a description of a perspective on teaching practices. Hartree declared that Knowles' main premise about the dichotomy between adults and children's learning was faulty. Hartree asserted that "Knowles himself would appear to be suggesting a developmental perspective rather than a dichotomy, a difference between adult and child learning, which is one of degree, not kind" (p. 204).

Additionally, Hartree (1984) argues that the underlying distinctions between pedagogy and andragogy were better conceptualized as a continuum of learning and were not entirely separate approaches for children and adults. Hartree further suggests that the characteristics of andragogy's five assumptions were previously also found in the learning behaviors of children. She wrote: "indeed the resemblance between Knowles' theory of andragogy and Dewey's theory of progressive education (for children) is considerable" (p. 205). This statement effectively nullifies the theory of andragogy for describing only adult learners.

Hartree's (1984) criticisms also weaken andragogy as an application for doctoral student learning. It has been argued that in doctoral study the emphasis is on the individual's complex cognitive development (Baxter Magolda, 1998, Lovitts, 2005) and the application of self-regulation skills that move beyond the historically generalized and simple concepts of adult learning. For example, King and Kitchener's (2005) reflective

judgment model draws on the type of advanced intellectual skills and development of reflective judgments, about the nature of epistemology and ontology, that is believed to facilitate students' transition from dependent learners to independent scholars and researchers (Boote & Biele, 2005; Gardner, 2008a; Lovitts, 2005). Specifically, King and Kitchener (2005) emphasize that reflective thinking was maximized by the use of educational practices and opportunities, whereby "students are encouraged to examine their assumptions, gather and interrogate the available evidence from multiple perspectives and be responsible for offering their own conclusions of evidence" (p. 500). This is by definition the hallmark of scholarly thinking and independent research (Boote & Biele, 2005). Moreover, King and Kitchener's model inadvertently describes new trends and assumptions of the ways that doctoral students learn best (McAlpine & Norton, 2006) such as approaches that incorporate learning communities and the community of practice model (Wenger, 1998).

As previously mentioned, most contemporary studies on adult psychosocial development and learning in graduate education and doctoral study have used socialization as the primary framework (e.g., Gardner, 2008b; Gardner et al., 2007; Golde, 1998). Weidman et al. (2001) defined socialization in graduate study as "the processes through which individuals gain the knowledge, skills, and values necessary for successful entry into a professional career requiring an advanced level of specialized knowledge and skills" (p. iii). Weidman et al. organized the socialization process of graduate students into four linear stages: anticipatory, formal, informal, and personal,

which represent variations in understanding and professional role commitment of graduate students.

Students in the anticipatory stage are neophytes to the roles, expectations, and processes of graduate education. Thus, it is important that students have opportunities to observe "others who interact with, express attitudes about, or ascribe status to current role incumbents" (Weidman et al., 2001, p. 12). In contrast, during the formal stage, students gain confidence from the successful performance of related tasks. This process moves the student from initial awareness to the acquisition of normative roles and "fitness" with the program of study is ultimately determined (Weidman et al., 2001, p. 13). The informal stage is where students begin to make the transition from student to professional. According to Weidman et al., this transition occurs in response to cues that students receive from others, usually fellow students, about their behavior and level of acceptable performance. The personal stage is where the "total role transformation" (p. 15) occurs. The process of professional identity development is a critical part of this stage. Weidman et al. note this is when students develop "scholarly concerns such as advancing knowledge in the field, and commitment to both personal and professional development beyond graduation" (p.15).

Socialization occurs in different ways and at different phases throughout a doctoral program (Ali & Kohun, 2006; Gardner, 2008b; Weidman et al., 2001). Many have considered socialization as a vehicle for the development of academic and professional social identity in doctoral education (Gardner, 2008b; Golde, 1998). Weidman et al. (2001) acknowledged this saying "socialization has also been recognized

as a subconscious process whereby persons internalize behavioral norms and standards and form a sense of identity and commitment to a professional field" (p. 6). As such, socialization is vital for assisting the successful social identity transition of doctoral students from dependent learners to independent scholars (Gardner, 2008a), which is arguably the major social identity developmental task of doctoral study in the United States (Berelson, 1960; Bowen & Rudenstine, 1992).

The theoretical approaches of adult development, adult learning and socialization in graduate education were presented here to represent extant theoretical approaches to understanding the development processes of graduate students. However, a closer look at all three approaches, adult development, adult learning and professional socialization in application to the specific learning needs of doctoral education and doctoral students' development reveals some deficits.

Each theory emphasized different aspects of adult development and learning, but all three described development and learning as a linear and sequential process that conceptually does not adequately address the diversity or depth of knowledge construction required of doctoral students. For example, Levinson's theory is based mostly on age and doctoral students vary greatly in age and similarly, Gardner (2008a) criticized socialization theory for not dealing with the complexity of experiences in doctoral education in particular, its monolithic treatment of all graduate levels and disciplines. Additionally, she noted that the frequent use of qualitative methods in many socialization research studies implies a lack empirical assessments and therefore inferential outcomes (Gardner et al., 2007). Most problematic is that these three

frameworks are limited in explaining the psychosocial development and socio-cognitive transitions, at the individual level, that doctoral students—as unique adult learners must undergo to be become independent researchers (Jones Young, 2001). For instance, upon closer examination none of the three theories adequately address the phases of dependence, interdependence, and finally independence that characterize doctoral education or the cognitive transition from novice student to scholar and independent researcher (Gardner, 2008a, 2009b; Lovitts, 2005).

Despite these shortcomings, alternative psychosocial and cognitive-based theories on doctoral student development have not been forthcoming (Gardner, 2009b; McAlpine & Norton, 2006). Again, since doctoral study is undertaken as an adult and adulthood was previously thought to be a period absent of development (Gardner, 2009b; Hoare, 2006), research on doctoral students' social identity and cognitive development is reported to be almost non-existent (Gardner, 2009b). One reason may be the loose structure and independent culture of many doctoral programs (Nettles & Millett, 2006), which may inaccurately convey messages to students and faculty that doctoral students should not need basic guidance and structure. Gardner similarly asserted that the working assumption in higher education is "that the graduate student is completely self-aware and entirely developed upon entering graduate school, almost as if the development of the student ceases upon graduation from an undergraduate institution" (Gardner, 2009b, p. 4).

However, transitions to new learning environments, such as pursuing a doctoral degree, can trigger the basic psychosocial needs of students regardless of age (Gardner,

2008b, 2009b; Goodman et al., 2006). Ascribing to this position, Gardner (2009b) argued that graduate and doctoral students can experience stages of psychosocial and cognitive development characterized by tasks usually found in theories about the development of traditional aged undergraduates (Arnett, 2004; Chickering & Reisser, 1993). Moreover, Gardner (2009b) posits that there is an "interconnectedness of psychosocial development and adult learning, particularly within the scope of developing competence and establishing identity, they are also vital components of the doctoral experience" (p. 23). Gardner's assertion of identity as a task of doctoral students' development merits inquiry into the factors, discussed in this study, which may contribute to students' convictions about themselves as independent scholars and researchers; a transformation that is the most frequently discussed social identity concept and academic and career transition for doctoral students (Gardner, 2008a; Lovitts, 2005, 2008).

Responding to the "dearth" of theoretical frameworks based on doctoral students, (Gardner, 2009b, p. 5), Gardner formulated a psychosocial model of doctoral student development that incorporated all three of the previous approaches. The model was developed from analyzing empirical studies and numerous student interviews (n = 177). As her guiding framework, Gardner used Sanford's (1967) theory of challenge and support to identify challenging developmental tasks and supporting mechanisms in three interrelated phases of doctoral education. Gardner's model is supported by the extant guiding theory on higher education attrition (Tinto, 1993), which states that if at any phase of development the requisite task challenges are not counteracted by supporting

mechanisms from the community, program, or institution, student departure is always a possible outcome.

The three phases outlined in Gardner's (2009b) model also correspond to major tasks and issues related to three research-doctoral program primary components "coursework, examination / assessment of skills gained through coursework and the production of independent research, often referred to as thesis or dissertation" (Gardner, 2009b, p. 30). Finally, and most relevant to this project, was that Gardner's model provides a useful scaffold within which to articulate the independent variables proposed to be related to researcher identity the dependent variable of the present research study.

Phase I

Phase one of the model is labeled entry. In this phase, students face challenges related to admissions, coursework, negotiating balance and learning to manage the expectations of graduate work. Within this phase we can contextualize the role of the first variable in the present study, stage of degree progress. As previously discussed, attrition in the early stages of doctoral study was mostly attributed to inherent deficits in individual students (Lovitts & Nelson, 2000), whereas, contemporary thought is that disciplines, departments, and programs may positively or negatively influence the process through inattention paid to basic psychosocial needs and a myopic focus on professional socialization (Gardner, 2009b; Golde, 1998). To counteract these, Gardner's model emphasized the criticality of social network supports such as orientation programs for new doctoral students and increased psychosocial opportunities for establishing relationships with peers and faculty throughout the entire course of study.

In general it could be presumed that students in the early stages of their doctoral degree program will have different challenges from their later stage counterparts (Tinto, 1993). Another consideration is, given that about two-thirds of doctoral students leave before candidacy (Bowen & Rudenstine, 1992; Golde, 1998), stage of degree progression also may be a factor in persistence (Tinto, 1993). Tinto described three stages of the process of doctoral student persistence: transition, years up to candidacy, and from candidacy to dissertation defense. Transition (stage one) consists of entry and the first year of study and involves the students' formal and informal opportunities for social and academic integration. Stage two begins with year two and continues to candidacy and involves students' competency development, which also plays a role in students' persistence. With the culmination of comprehensive exams begins stage three, which takes the student from candidacy to completion and defense of the dissertation.

Other researchers (Baxter Magolda, 1998; King & Kitchener, 2005; Lovitts, 2005) suggests that stages of degree progress are differentiated by the increased and advanced knowledge orientations and skill development. Baxter Magolda (1998) found in a longitudinal study (n = 101 in the first year and n = 70 in post-college phase) were that students in the early stages of doctoral education tended to view knowledge contextually in contrast to the preferred reflexive thinking (King & Kitchener, 2005) that is a developmental marker usually observed in later stages of study. Furthermore, Baxter Magolda (1998) found that as students progressed in their program of study and their capabilities increased, they were more likely to be exposed to learning environments that developed and increased their capacities for self-authorship. In light of these findings, it

is important, therefore, to consider stage of degree progress in the expectation of "emerging independent knowing" in doctoral students and their perceptions of themselves as researchers (Baxter Magolda, 1998, p. 52).

Phase II

Phase two of Gardner's model of doctoral student development includes coursework and a period of social and academic integration. Challenging tasks include mastering and completing coursework, oral and written qualifying examinations and the subsequent role changes from being socialized to academic scholarship (Gardner, 2009b). Most important, Gardner (2009b) emphasized that the major phase two developmental transformation involved "making the transition from being a knowledge consumer to a knowledge producer" (p. 10). Gardner went on to suggest facilitating the development of peer relationships and a collegial and effective advisor relationship as critical strategies to support students in this phase. These supports are congruent with Lovitts' (2005) assertions that students with strong formal resources—caring mentors, clear program structure and organization and informal resources—peers, department faculty and other social and professional networks will successfully make the transformations required during the independent research stage.

In this phase, the variable of mentoring effectiveness can be contextualized because it has been shown to be an early critical component of doctoral education (McAlpine & Norton, 2006; Tinto, 1993) and moreover, the development as a professional researcher (Hall & Burns, 2009). First, however, it must be noted that in the literature the terms mentor and advisor are often used interchangeably (Berk et al., 2005;

Fisher & Zigmond, 1998; Waldeck, Orrego, Plax, & Kearney, 1997). Nonetheless, optimal mentoring and advising has been posited to be invaluable in doctoral students' educational experience and especially critical in learning how to conduct research (Fisher & Zigmond, 1998; Waldeck et al., 1997).

Reports on a survey of top factors contributing to degree completion, conducted on recent doctoral graduates by the Council of Graduate Schools, listed mentoring and advising (65% of responses) as second only to financial support (Jaschik, 2009). Berk et al. (2005) articulated what they called the "mentoring relationship" (p. 67), which they denoted as a voluntary relationship that should be initiated by the mentee and one in which the "faculty with useful experience, knowledge, skills, and or wisdom offers advice, information, guidance, support" (p. 67). Reinforcing it as a critical component in graduate study, they posited a scale by which individuals or programs could assess the degree of effectiveness of this relationship.

Waldeck et al. (1997) reported that students (n = 145) across the multiple disciplines they studied, relied most heavily on psychosocial support from their mentors. Fisher and Zigmond (1998) stressed the importance of mentor/advisor compatibility and identified several critical variables that should preclude selection of a mentor/advisor including: (a) student's role in creating the research questions; (b) opportunities for authorship with mentor on research publications; and (c) time and effort allocated by mentor to support students' research and deep understanding of dissertation expectations. These variables were found to require the development of close relationships between mentors and protégés in doctoral study (McAlpine & Norton, 2006).

Additionally, mentoring effectiveness has been found to impact students' satisfaction, attrition and time to degree by discipline (Ferrer de Valero, 2001; Golde, 1998, 2005) and persistence (Tinto, 1993). For instance, Ferrer de Valero (2001) argued that students' stress levels are increased "when they do not have a close relationship with the chairs of their committee, when they work alone, and when less feedback is provided" (p. 345). In a large qualitative study (n = 58), Golde (1998) found that incompatibility with one's advisor was a critical reason for departure of science doctoral students. In the study, reasons for departure given by students in these disciplines were attributed to the dependency of science students on mentors for a research topic and dependency on educational funding through the advisor's research grant. However, humanities students in the same study reported that single advisor compatibility was less important due to a disciplinary culture of more team advising in their fields (Golde, 1998).

Somewhat contrary results were obtained in a similar study (Seagram, Gould, & Pyke, 1998) that noted differences in students' perceptions of the role of mentoring effectiveness by discipline. These researchers found that the time to degree of social science doctoral students was affected by issues such as difficulty obtaining a mentor and longer periods lacking feedback from the faculty mentor. In contrast to Golde's (1998) findings, natural science doctoral students in Seagram et al.'s study reported high levels of mentor effectiveness and had shorter time to degree, which was attributed to those students being able to meet with the mentor regularly and almost daily feedback from mentors in the laboratory environment. Similar outcomes were found in another study,

Maher et al. (2004) (n = 160), which linked the time to degree completion of female doctoral students to the frequency, nature, and effectiveness of the advising relationship.

Overall in their implications, researchers have advocated for increased frequency of meetings with the mentor as a cross-disciplinary strategy to combat extended time-to-degree. However, none of the aforementioned studies delineated the impact of these issues as differentiated by non-traditional enrollment statuses such as part-time study. In Golde's (1998) study, since science programs tend to be full time this would have been important clarifier. Finally, research has shown that mentors also may influence students career interests (Tinto, 1993). Tinto summarized the critical role of mentoring in degree persistence and laying the foundation for career interest:

> The character of student-faculty interactions may influence not only later faculty sponsorship but also the quality of what is learned about the nature of profession or field. Simply put, an informed and influential adviser may be invaluable to the early occupational success of the candidate. (p. 237)

Furthermore, current research (Hall & Burns, 2009) suggests that doctoral student mentors most heavily influence the professional preparation, identification, and career interest of their students.

Phase III

The final phase in Gardner's (2009b) model is marked by the completion of examinations and attainment of candidacy status. Doctoral students who have successfully managed the first two phases are rewarded with the new challenges of dissertation work, job search and professional role transitions (Gardner, 2009b). The role

of the final two independent variables in the present study—research experience and research self-efficacy can be articulated in the context of this phase because they directly relate to the major challenges, transitions, and supports identified by Gardner. The dependent variable of independent researcher identity will be discussed separately at the conclusion of this section.

Gardner (2009b) specifically states that in Phase III, "students are faced with the daunting challenge of completing independent research for the dissertation and may also begin seeking professional positions" (p. 10). Depending on the discipline, during Phase III students also may experience a doctoral education paradox: isolation as a result of their success in achieving this final stage (Ali & Kohun, 2006; Gardner, 2009b). A lack of regular social interactions and loneliness are frequently identified as latent but major contributing factors to graduate and doctoral student late stage attrition (Ali & Kohun, 2006; Gardner, 2008b; Weidman & Stein, 2003 Weidman et al., 2001). For example, Ali and Kohun found that isolation, especially once coursework is completed became the foundation for feelings of abandonment in doctoral study. Alluding to variations by discipline, they identified the post-coursework tasks of writing the proposal and conducting research in the humanities and social sciences as extremely isolating tasks. The researchers determined that isolation undermines students' motivation and may prevent them from making the appropriate transitions and growth in their educational process often resulting in prolonged all but dissertation status (Ali & Kohun, 2006). Thus, to support students in this transformative phase, Gardner (2009b) suggested the

implementation of writing groups and daily interaction with the faculty mentor or other advisors such as committee members.

Some researchers (Phillips & Russell, 1994) have suggested that the dissertation task may be less daunting for those students who have prior research experience. Working on research projects, prior to the dissertation, provides students with opportunities to develop and practice critical researcher skills (Phillips & Russell, 1994; Maher et al., 2004). Unfortunately, opportunities for early and extensive research experience in doctoral education have been found to be disparate across disciplines of study (Anderson & Swayze, 1998; Golde & Dore, 2001). Research training may be either integrated or compartmentalized and formal or informal depending on the discipline (Anderson & Swayze, 1998).

Research during doctoral study has many contradictions. Ironically, Anderson and Swayze's (1998) findings from a national survey of doctoral students (n = 1,400) were that two-thirds of students indicated that a desire to do research was a highly important factor in the decision to pursue graduate study. Yet, 35% of third year doctoral students surveyed by Golde and Dore (2001) indicated they did not feel prepared by their coursework to conduct independent research. Furthermore, Lovitts (2005) reported actual percentages for the Golde (1998) study by disciplines to be: laboratory sciences (biological 40% and physical 42%) and non-laboratory sciences (social sciences 31% and humanities 29%).

These findings suggest that, although learning to conduct research may be a common aspiration, becoming a researcher is not a doctoral student universal experience

(Anderson & Swayze, 1998; Golde & Dore, 2001). Therefore, multiple exposures to the research experience maybe a significant improvement to the experiences of some kinds of doctoral students. In some disciplines, actual research activity occurs in only two periods of time, pre dissertation proposal (Maher et al., 2004) and the dissertation project itself (Seagram et al., 1998). It has been argued that the incorporation of expanded, earlier and more frequent opportunities to conduct research, prior to the dissertation, could improve doctoral student outcomes in these disciplines (Council of Graduate Schools, 2008; Golde & Dore, 2001).

In social science disciplines such as Education, more actual experiences conducting research prior to the dissertation is warranted. Kluever (1997) found that most students in doctoral study described themselves as novices at conducting research, which may imply a lack of significant opportunities in their course of study to develop research experience. This is especially problematic since research experience has been found to be positively related to doctoral student self-efficacy (Betz; 1986; Brown, Lent, Ryan, & McPartland, 1996), productivity (Phillips & Russell, 1994) and timely completion of the dissertation (Maher et al., 2004). Additionally, lack of research experiences may disproportionally impact the outcomes of women versus men. For example, Smith (1995) found that men were awarded more research assistantships than women.

Moreover, Maher et al. (2004) (n =160) found that 81% of women who were classified as early finishers (average of 4.6 years to degree) reported having at least one research experience prior to the dissertation. In the same research study female doctoral

students who did not have prior research experiences took longer to complete and reported feeling unprepared to conduct their dissertation research. Maher et al. (2004) quoted one such student who said, “I wonder about my ability to conduct research. In the school of Education, we are tied to the project of others and don’t ever deal with certain aspects of the work until the dissertation” (p. 400). These sentiments illustrate the growing disconnect between students’ expressed desire for increased research experience and the limitations of the curriculum in some doctoral programs (Golde & Dore, 2001).

Such student pleas also are consistent with national statistics on the subject (Golde & Dore, 2001). Moreover, it highlights the importance of providing earlier opportunities for the development of research skills in doctoral study (Betz, 1986; Brown et al., 1996). Asserting this, Gardner (2008a) stressed the early introduction of independent or collaborative research experiences to better prepare students for dissertation work. Similarly, Stacey (2006) asserted that doctoral programs need to “identify and develop the kinds of experiences that efficiently and effectively lead students to become good researchers” (p. 197).

In some disciplines (e.g., counseling psychology), this has fueled interest in identifying factors that support and develop students’ research self-efficacy (Phillips & Russell, 1994). Phillips and Russell listed among others factors such as early involvement with research, experience with actual projects, faculty encouragement and modeling, and positive faculty-student interactions. In particular, the universality of experiential learning makes research experience germane for further inquiry and study.

As mentioned, the concept of research self-efficacy also has been garnering much attention from contemporary researchers (Forester, Kahn, & Hesson-McInnis, 2004; Holden et al., 1999). Holden et al. (1999) defined research self-efficacy in doctoral students as "the extent to which students are confident about carrying out different research tasks, from the library research to designing and implementing practice research projects" (p. 464).

The growing popularity of research self-efficacy as a critical component of doctoral students' socio-cognitive development is further evidenced in the growing number and quality of instruments attempting to measure it (Forester et al., 2004; Phillips & Russell, 1994). Furthermore, increasing research self-efficacy has been determined to be effective in understanding how to foster and maintain students' research interest (Forester et al., 2004; Holden et al., 1999). For example, with goals of improving the clinical research training environment, researchers have previously linked important outcomes such as students' perceptions of their graduate programs (Phillips & Russell, 1994) or maladaptive academic behaviors (Betz, 1986) to a sense of strong or weak research self-efficacy in doctoral students.

Phillips and Russell (1994) surveyed doctoral counseling psychology students (*n* = 125) at 12 different institutions across the nation. Data were solicited and collected from students based on either beginning vs. advanced status. Strong or weak research self-efficacy was determined to have mediating and positive effects on students' productivity. However, contrary findings were reported for a similar relationship between the research training environment of their program and research productivity. Phillips and

Russell's initial finding of no significance between the research training environment and research productivity, despite previous research cited to the contrary, differed when the sample was limited to only the advanced doctoral students. After isolating these students, the researchers concluded that there was an interactional effect based on stage of degree; advanced students' research productivity and research self-efficacy were greater than beginning students' and both were significantly and positively related to the research training environment.

However, Brown et al. (1996) argued that the data analyses, previously conducted by Phillips and Russell, were limited by the simplicity of the "bivariate relations of self-efficacy and training environment to productivity" (p. 536). Moreover, Brown et al. were skeptical that there had been valid and reliable mediating reactions between students' perceptions of their training environments, their research self-efficacy and levels of productivity. They re-tested the mediating hypothesis and, furthermore, looked for differences by sex (Phillips and Russell had collapsed groups by sex) and stage of degree progress (beginning vs. advanced). Notable were Brown et al.'s findings that the relationship between research self-efficacy and research productivity was different for men and women. Male research self-efficacy beliefs were a stronger factor in their research productivity than for their female counterparts. Also, there was a stronger relationship between perceptions of the research training environment and women's research self-efficacy. From their reanalysis Brown et al. concluded there was support for Phillips and Russell's original mediating hypothesis, and moreover, that differences existed by sex.

However, in the original study by Phillips and Russell and the reanalysis by Brown et al., there was no specific attention paid to the influence of previous research experience. For instance, research experience (Maher et al., 2004) potentially could have been a confounding variable to Brown et al.'s differential findings by gender on the interaction effect between research self-efficacy and students' productivity. Furthermore, Pajares (1996) asserted that gender differences in self-efficacy studies could be false especially when controlling for other factors such as previous experiences and achievements, factors absent from both of these studies. Finally, the original study was based on a small number of students and a single discipline of study, so possible inferences from the findings are limited. However, the study also suggested a relationship could exist between stage of degree progress (beginning versus advanced), training environment, and the development of research self-efficacy, two of which are independent variables in the present study. Over and beyond other similar research, the present study will also include the potential influence of research experience and mentoring effectiveness as other potentially mediating variables.

Characteristics of an Independent Researcher Identity

Deaux (1993) defined identity as the "social categories in which an individual claims membership as well as the personal meaning associated with those categories" (p. 4). Thus, the concept of an independent researcher identity posited in this study is drawn from the literature and theories on social identities (Deaux, 1993; Gee, 2000; Hogg, Terry & White, 1995; McEwen, 2005; Stets & Burke, 2000) including more recently, the concepts of collective identity (Ashmore, Deaux, & McLaughlin-Volpe, 2004) and

academic identity (Henkel, 2005). Furthermore, Deaux (1993) emphasized that social and personal identities were interrelated and social identities were based on the roles that individuals choose to represent themselves and claim. Later, McEwen (2005) argued that social identity theories were more reflective of global versus personal attributions because they largely resulted from an individual's engagement with complex socio-cultural and political contexts.

Hogg et al. (1995) conducted a rare comparative analysis of identity theory and social identity theory. They credited identity theories with individual role formation and social identity theories with categories or groups. The researchers emphasized the importance of context in social identity discourse and argued "the contextual salience of specific social identities rests on the extent to which they render maximally meaningful a particular context, and contextual factors influence the form taken by identity-contingent cognitions and behaviors" (p. 262). Further describing social identities the researchers also noted they were descriptive, prescriptive, and evaluative. Later, Stets and Burke (2000) challenged that the analysis and distinctions of identity theory and social identity theory of Hogg and colleagues were superficial and instead concurred with Deaux's original claim that personal identity and social identity are more similar than dissimilar and therefore should be linked in descriptions of the self, a position that is a part of the guiding principles of the present study.

As previously discussed, theories on identity development in doctoral study are lacking (Hall & Burns, 2009). Arguably, most theories on identity, in college student populations, stem from the work of Erik Erikson (1956) on ego and psychological

functioning. In particular, Marcia (1966) expanded upon Erikson's previous work by conceptualizing four identity statuses based upon an individual's level of identity commitment. They are: (a) diffusion status is an initial period of no commitment; (b) foreclosure status usually represents a premature and unstable commitment; (c) moratorium status is often characterized by a state of crisis and unstable commitment; and (d) achievement status describes an individual who has resolved the aforementioned crisis and exhibits a high level of commitment. Furthermore, Marcia argued that achieved individuals performed better under stress, were more persistent, and most importantly had a "realistic level of aspiration" (p. 557). Achieved status categorized individuals also have high levels of social-cognitive information processing and adaptability (Berzonsky & Neimeyer, 1994).

Adams and Marshall (1996) further asserted that identity has five functions it provides: (a) a structure for understanding who one is; (b) meaning and direction through commitments, values, and goals; (c) a sense of personal control and free will; (d) consistency, coherence, and harmony between values, beliefs, and commitments; and (e) identity enables the recognition of potential through a sense of future possibilities, and alternative choices. Taken together, Marcia's (1966) concept of achieved identity status and Adams and Marshall's (1996) five functions of identity provide the foundation for the concept and measurement of independent researcher identity in the present study.

Anderson and Swayze's (1998) concept of socialization in graduate education emphasized the development of a graduate education context-generated identity. The authors asserted "graduate school as a socialization process involves divestiture, in the

sense of shedding one's previous self-conception and taking on a new view of self that reflects one's role in that group" (p. 9). In the current study the "new view of self" that Anderson and Swayze described has been connoted as independent researcher identity, an emerging term in the literature on doctoral education (Gardner, 2008a; Lovitts, 2005, 2008). Therefore, the use of the term being suggested is not to describe an internalized state such as found in visual racial and ethnic group identity descriptions (Helms, 2005), but instead to describe a social identity connected to the role capable of being performed by an individual within American society (Gee, 2000) and one that must be successfully negotiated by doctoral students (Hall & Burns, 2009). Furthermore, Ashmore et al. (2004) more recently clarified Deaux's (1993) former concept of social identities and offered the new terminology of collective identity.

> Collective identity, as it is variously used, connotes not only a belief in categorical membership (i.e., that one shares characteristics with a group of others) but also a set of cognitive beliefs associated with that category such as stereotypic traits thought to be shared by category members or ideological positions that define the group's goals. (p. 82)

Ashmore et al.'s elucidation of shared "stereotypic traits" and "cognitive beliefs" symbolic of collective identity is congruent with findings from Gardner et al.'s (2007) study that looked at the skills and dispositions determined most relevant for students pursuing the research PhD. The researchers gathered opinions from students and faculty members (n = 11 for each and total of 22) in one school of education. Two major themes emerged from their study: identification of certain habits of mind and specific skills and abilities. The findings for habits of mind were quest for knowledge, independence, and

humility. The findings for skills and abilities were an ability to synthesize, analyze, and conduct research and the ability to communicate findings. Gardner et al.'s conclusions are important because they describe personal characteristics of a researcher and more importantly, also identify specific actions and behaviors that may promote it.

In a later study, Gardner (2008a) used the terms independent researcher and scholar interchangeably and described this status as a transition from consuming to creating knowledge. Furthermore, Gardner asserted that the phases in her model of doctoral student development, regardless of discipline, in totality represented a student's journey toward scholarly independence. Gardner wrote that "the students in this study all discussed their own personal growth and identity shifts in regard to their changing experience and their journey toward independent scholar" (p. 334). Consistent with Gee's (2000) emphasis on the direct relationship between identity and one's role performance in society, Gardner concluded independence as researcher was an evaluative and declarative statement of students' potential as scholars and an expectation of the professional realm.

Finally, similar to Gardner et al.'s (2007) research, Lovitts (2005, 2008) listed personal and interpersonal characteristics (traits) of the independent scholar/researcher as: creativity, intelligence, knowledge, thinking styles, motivation, and personality. These characteristics or traits when fully developed in doctoral students during the final stages of study were implicated by Lovitts and others to increase the likelihood of producing independent researchers who would be known for conducting high quality and innovative research. Moreover, they lend support for the present study's central hypothesis which posited that independent researcher identity was likely to be predicted by doctoral

students' level of confidence in their capability and abilities for conducting independent research and creating knowledge in their disciplines. In addition, that its achievement could also be empirically measured by their degree of conviction and self-identification with the characteristics and traits of an academic or professional researcher (Gardner, 2008a; Gardner et al., 2007; Holden et al., 1999; Lovitts, 2005).

Research on Racial and Ethnic Minority Doctoral Students

The experience of doctoral students also needs to be considered in light of nativity, social status, and racial and ethnic differences. Some (Le & Gardner, 2010; McAlpine & Norton, 2006; Nettles, 1990; Santiago & Einarson, 1998) argue that previous and current research literature has treated doctoral students too monolithically. Today's doctoral students are known to be diverse in many facets such as socio-economic backgrounds (Nettles, 1990), national origin (Le & Gardner, 2010), gender (Santiago & Einarson, 1998), and race and ethnicity (McAlpine & Norton, 2006; Nettles, 1990). Given this great diversity, researchers' interest in studying the differences in doctoral education experiences (Nettles, 1990) and performance issues (Le & Gardner, 2010; Santiago & Einarson, 1998) among and across diverse groups of students has been increasing.

According to Nettles (1990), most research on diverse student groups has emphasized their underrepresentation. Conversely, Nettles argued more attention needed to be given to factors that contribute to similarities and differences in the doctoral education experiences of Black, Hispanic, and White students. In such a study, responses from a large sample of 1,352 students (23.2% Black; 10.6% Hispanic; 68.9% White),

from several disciplines (education, social sciences, humanities, biological and physical sciences), full and part time status, and at different stages (95% of each group completed at least half of coursework and 39% of Blacks, 32% of Whites, and 28% of Hispanics were at dissertation stage) were analyzed for perceptions regarding enrollment after undergraduate study, perceptions of the campus climate and financial support through assistantships.

Major findings of Nettles's study were that post baccalaureate Hispanic students entered doctoral study earlier than both Blacks and Whites, were more likely to enroll full-time, and were the most socially involved during their program of study. Furthermore, although both Hispanic and Black students reported experiencing racial discrimination, Blacks reported the highest perceptions of institutional racially based discrimination. Nettles also cited major discrepancies in financial support, especially the awarding of teaching and research assistantships. Among the three groups, Blacks received fewer awards than both Hispanics and Whites. The study had several limitations which included potentially confounding factors such as a large number of Puerto Rican students in the Hispanic sample and large numbers of Blacks from low SES backgrounds who may have been less academically prepared. In addition, the study did not examine the impact of any of these differences on self-beliefs of these students. Additionally, the study participants were not differentiated by other factors such as stage of degree, part-time or full time, and international or domestic status.

The latter may be important as qualitative differences in doctoral education experiences have been attributed to nationality. For instance, in a recent study Le and

Gardner (2010) interviewed nine Asian international doctoral students majoring in science disciplines at one large research extensive institution about their socialization and persistence to degree experiences. Some notable findings were that international students felt solely responsible for their academic and non-academic transitions and integration to the institution, had delayed research experiences due to being required to take extra courses in English, and believed they were more dependent on faculty for socialization and financial support (funding from the research mentor) than their domestic counterparts, all of which increased their stress levels. Due to a qualitative framework, these findings were descriptive of only one group of individuals and one institution, which is a major limitation. However, Le and Gardner's findings were consistent with previous findings from a quantitative study conducted by Rose (2005), which found that international students (n = 144) representing over 50 countries reported higher scores versus their domestic counterparts on a subscale that measured the degree of importance students attributed to the mentor relationship.

Most relevant to the present study, Santiago and Einarson (1998) conducted a study on the relationship of background characteristics (race and gender) and academic predictors (GRE scores and academic credentials) in predicting the self-beliefs (self-confidence and self-efficacy) and outcomes of graduate science and engineering students (n = 290). The researchers asserted a social-cognitive mediational hypothesis between variables that was similar to Phillips and Russell (1994) and also hypothesized differences by gender similar to Brown et al. (1996).

Congruent with previous findings (Brown et al., 1996), Santiago and Einarson (1998) asserted there were differences, by gender and ethnicity, in students' self-confidence, self-efficacy outcome expectations. Most interesting were the findings that background characteristics (gender and ethnicity) were related to students' perceptions of a positive or negative effect on their chances of admission to graduate school. Specifically, women (42%) felt gender was an asset as compared to only 2% of men and, whereas no women indicated gender to be a liability, 8% of men perceived they were disadvantaged by their gender in the admissions process. Additionally, men (both Anglo and minority) believed their race had a negative effect on their admission.

Furthermore, Santiago and Einarson (1998) also reported that perceived negative effects based on racial status (minority versus majority) predicted academic self-efficacy in males but not females. Additionally, these differences were more likely to be related to social-cognitive variables (self-confidence and self-efficacy) and **i**nstitutional factors such as funding and degree of academic integration and socialization than they were related to the usual background academic predictors assessed upon entry to graduate school.

Summary

Gardner's (2009b) Doctoral Student Development model and other psychosocial frameworks provide a context for a review of the literature on the social and cognitive factors and critical transitional events that usually occur in pursuit of a doctoral degree. A major shortcoming, however, is that Gardner's model and most literature on doctoral students only briefly and generally references the concept of identity development. For

instance, Gardner's (2009b) only treatment was one sentence stating that "as students progress through the phases, they also experience personal identity development" (p. 10). Gardner rationalizes such brief coverage through a primary argument that identity may be equally influenced by the psychosocial challenges of each phase as much as by other external factors. Yet, others (Anderson & Swayze, 1998; Baxter Magolda, 1998) have acknowledged that the hallmark of advanced learners is that they are expected to develop their own perspective on the nature of and construction of knowledge (Baxter Magolda, 1998; King & Kitchener, 2005). Baxter Magolda (1998) called this process self-authorship and said "self-authorship requires a sense of identity through which individuals perceive themselves as capable of knowledge construction" (Baxter Magolda, 1998, p. 41), a stance which supports that identity development in doctoral study should be more intentionally directed (Hall & Burns, 2009) than implied by Gardner's auxiliary reference.

Thus, an improvement to Gardner's model and the aim of the present study was to draw attention to the importance of early and continuous development of an independent researcher identity for doctoral students. As such, this study investigated a hypothesized empirically based relationship between several select variables that were posited to contribute to the independent researcher self-perceptions of doctoral students. In this study, a model comprised of four variables: (a) stage of degree progress, (b) research self-efficacy, (c) mentoring effectiveness, and (d) research experience collectively was posited to be predictive of students' perceptions of themselves as independent researchers. Furthermore, a function of achieving a particular professional identity is that

it provides individuals with possibilities and alternative choices (Adams & Marshall, 1996), such personal identification and degree of conviction as a researcher also was conceptualized to have a relationship to students' present and future research career interests. The next section describes the study's socio-cognitive based conceptual framework used for studying the relationships among these select variables.

Conceptual Framework

Social cognitive theoretical perspectives, such as self-efficacy (Bandura, 1977, 1986) and its role in career decision making (Betz & Hackett, 1986) provide an adaptable and integrative framework for studying doctoral students' psychosocial functioning, academic and professional socialization experiences, and research career-related behaviors. The relationships between human cognitions and factors in their environments are contextualized within social cognitive theory (Bandura, 1977, 1986). Social cognitive theory conceptualizes how one's personal (e.g., thoughts and beliefs), behavioral, and social/environmental factors interact in individual learning (Bandura, 1977, 1986; Pajares, 2002; Schunk & Pajares, 2004). Social cognitive theory states that the relationships between these three factors, in human cognitions, are reciprocal and contribute to the overall development of an individual's self-beliefs (Bandura, 1977, 1986).

Furthermore, the theory posits that the interactions between these triadic factors are unique to the individual, the behavior being studied, and the environmental conditions at the given time (Bandura, 1986). Inherent in the theory is the concept of reciprocal determinism, which articulates the reciprocal nature of the triadic relationship between

self-efficacy beliefs, outcome expectations, and the development and execution of goals (Bandura, 1986). Reciprocal determinism illustrates that individuals are both products of and primary contributors to their environments (Bandura, 1986; Pajares, 1996).

Situated within social cognitive theory is the major construct of self-efficacy, or the pervasive beliefs held by an individual about one's capability to successfully perform at levels required to achieve a desired outcome (Schunk & Pajeres, 2004). Bandura (1986) most significantly evolved the theoretical variable of self-efficacy. According to Bandura, self-efficacy beliefs are at the core of cognitive theory, and they provide the basis for human actions and learning motivations. Bandura (1986) defined self-efficacy as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (p. 391). Bandura posited that adaptation is facilitated by either a strong or weak sense of self-efficacy or beliefs about competence.

Moreover, Bandura (1977, 1986) argued there are four major sources for the development of personal self-efficacy: (a) actual performance or mastery experience, (b) vicarious experience, (c) social persuasion or feedback of others, and (d) physiological and emotional reactions. First, it must be emphasized that performance accomplishments, derived from personal mastery of appropriate level tasks, are considered to be the most influential and effective source of self-efficacy development (Bandura, 1977). For example, an individual's self-efficacy belief may influence how that person approaches a task and in turn, cumulative personal experiences, with that task or similar tasks, influences self-perceptions and future situational expectations of mastery and

performance (Bandura, 1977). If individuals believe themselves to be capable of being successful at a task, then their self-efficacy may be raised by their perceived mastery of that task. Conversely, if they believe they will fail, then self-efficacy may be undermined, depending on other factors within the individual, environment, or total pattern of experiences (Pajares, 2002).

Second, self-efficacy and learning also may be derived by vicarious experiences such as observing the task performance of others and modeling their behaviors. This source is useful when individuals lack prior experience with task performance (Schunk, 1987). Vicarious experiences effect self-efficacy most powerfully when "similar others" (Bandura, 1997) such as peers (Schunk, 1987) are involved.

Third, verbal feedback from others effects self-efficacy in the form of social persuasions (Bandura, 1977; Pajares, 2002). For example, feedback that students receive from parents or teachers, or in the case of doctoral students' faculty mentors, can positively or negatively impact their academic self-efficacy (Pajares, 1995) or career aspirations (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996).

Fourth and finally, Bandura (1977) noted that self-efficacy development included a physiological component he called "emotional arousal" (p. 198). An individual's level of anxiety and self-efficacy are indicated by their emotional reactions and affective physiological responses to performing a task or taking a specific action. According to Bandura (1977), this somatic aspect of self-efficacy development is largely intra-psychic.

Although these four mediums are generally considered to be the principle sources of an individual's efficacious perceptions, researchers (Pajares, 1996, 2002; Schunk &

Pajares, 2004) caution that self-efficacy beliefs are also sensitive to the nuances of contextual factors, individual interpretations, and personality characteristics. In other words, discrepancies can exist between what is actually experienced and what is formally or informally integrated into an individual's efficacious beliefs (Pajares, 2002).

Moreover, self-efficacy is most accurately measured by the degree and magnitude of an individual's confidence to complete not global but very situation specific tasks (Bandura, 1977; Pajares, 1996). Major assertions and research findings that self-efficacy influences activity selection, effort, and persistence (Bandura, 1977, 1986) makes the self-efficacy construct highly useful for researchers studying academic motivation, learning, and student achievement in educational contexts (Pajares, 1996). In fact, Bandura (1997) argued that academic skills combined with self-efficacy are better predictors of intellectual behavior than "skills alone" (p. 216). In general, students develop their academic self-efficacy from engaging in opportunities in their academic environments (Bandura & Schunk, 1981) and from their positive or negative experiences with success on domain specific educational tasks (Pajeres, 1996). Students with high self-efficacy will view domain task difficulty as challenges that can be overcome with persistence rather than hopeless situations to be avoided (Maddux, 1995; Vuong, Brown-Welty, & Tracz, 2010). Notably, researchers assert that self-efficacy does not replace actual skill (Bandura, 1977). Rather, self-efficacy is the collective judgments that individuals hold about their capabilities or what they can do with the skills they already have already (Bandura, 1997; Schunk & Pajares, 2004).

Furthermore, Bandura postulated that a strong and well developed sense of self-efficacy will enhance personal well-being. Highly efficacious persons are confident in their capabilities to perform challenging tasks thus when they are faced with adversity or minor failures, display attitudes of resilience and have rapid recovery strategies (Bandura, 1986). Therefore, persons with a strong sense of self-efficacy exhibit high levels of effort, commitment, and persistence. Conversely, low self-efficacious persons often doubt their performance and achievement capabilities, avoid difficult situations, and may actually perceive challenging tasks as threatening (Bandura, 1977, 1986). Thus, they may be unable to overcome obstacles, give up or exhibit avoidance behaviors, and even ultimately as a result of their low sense of efficacy and fall into depression or other maladaptive affects (Bandura, 1986; Pajares, 1996, 2002).

Throughout the social science and educational literature, the construct of self-efficacy has been widely discussed, and it has become one of the most frequently researched social cognitive variables (Bong & Clark, 1999; Pajares, 2002; Schunk & Pajares, 2004; Schunk & Zimmerman, 2006) of social cognitive theory. Self-efficacy beliefs have been proven to both influence and predict task performance and goal persistence (Bandura & Schunk, 1981; Schunk & Pajares, 2004). Most relevant to the present study, self-efficacy researchers (Bong & Clark, 1999; Maddux, 1995; Pajares, 1996) have demonstrated the construct to be positively correlated and predictive of academic achievement. Notably, Maddux (1995) asserted that strong self-efficacy helps to reduce the anxiety and confusion that individuals may feel when they are placed in especially challenging academic situations.

Applying social cognitive theory's tenets to doctoral study, students who have high competence beliefs are believed to have complementarily high levels of educational participation, persistence, and achievement (Bandura & Schunk, 1981; Schunk & Pajares, 2004; Schunk & Zimmerman, 2006). Doctoral students with highly competent self-beliefs may persist longer than their self-evaluated less competent counterparts (Betz, 1986). Doctoral students who do not feel positively about their capabilities to complete learning tasks may experience high degrees of stress that can interfere with learning and ultimately effect academic effort and persistence leading to low productivity (Brown et al., 1996; Phillips & Russell, 1994), prolonged ABD status or attrition (Maher et al., 2004; Seagram et al., 1998). In contrast, doctoral students with high academic self-efficacy will generally persist, manage academic adversity better and be more productive (Brown et al., 1996; Lent, Brown, & Larkin, 1984; Phillips & Russell, 1994).

Furthermore, social cognitive theory emphasizes self-referent thinking in mediating behavior and motivating individuals (Lent et al., 1994). To conduct original research students must have learned the requisite skills and have strong beliefs in their capabilities as researchers. As previously mentioned, this belief is an outcome of being well prepared and having attained self-authorship (Baxter-Magolda, 1998), an epistemic view (Henkel, 2005) and reflective judgment abilities (Boote & Biele, 2005; King & Kitchener, 2005). This type of heuristic (Padilla, 1999) and tacit knowledge is optimally gathered from personal experiences with the tasks related to research: such as selecting a topic (Maher et al., 2004), conducting a philosophical and disciplinary grounded review of the literature (Boote & Biele, 2005), collecting and analyzing data, and interpreting

results (Holden et al., 1999) all culminating with writing up and disseminating their research findings which is also indicative of productivity (Phillips & Russell, 1994).

Also important are the opportunities doctoral students have for vicarious learning from the experience of others, such as from peers who have traversed the pathways of doctoral study successfully (Mullen, 2003; Mullen, Fish, & Hutinger, 2010; Stalker, 1991; Weidman & Stein, 2003). Furthermore, doctoral students need consistent socially persuasive mechanisms such as receiving guidance and regular feedback from their faculty mentor (Maher et al., 2004; Mullen et al., 2010; Seagram et al., 1998). Finally, doctoral students need to set proximal and achievable goals, such as presenting at professional conferences and publishing during their program of study to build their confidence and competence (Golde & Dore, 2001). The aforementioned research-related activities are relatively safe ways to gain the types of experiences that reinforce research self-efficacy (Holden et al., 1999) and may mediate the type of defensive behavior that leads to ABD status and attrition (Golde & Dore, 2001).

In the social cognitive framework, goal setting is critical to self-regulation (Bandura, 1986). Therefore, it could be inferred that it is important to help doctoral students become successful researchers by building their research self-efficacy early and consistently through goal setting (Phillips & Russell, 1994). Doctoral students, who had proximal positive experiences with research were found to feel less frustrated, isolated and developed a higher sense of academic and research efficacy (Brown et al., 1996; Phillips & Russell, 1994), something that should remain stable and make them resistant to "the negative impact of occasional failure" (Bandura, 1977, p. 195). Additionally,

these doctoral students may be able to develop resilience and persist in the face of previously articulated periods of isolation which is believed to be a major factor in time to degree and attrition in some disciplines (Ali & Kohun, 2006).

In the present study, Education doctoral students' degree of independent researcher identity was posited to be predicted in combination by four socio-cognitive variables: (a) stage of degree progress, (b) research self-efficacy, (c) research experience, and (d) mentoring effectiveness. Relative to the conceptual framework, these variables also represent aspects related to social cognitive career theory's (Brown & Lent, 1996; Lent et al., 1994) major variables of self-efficacy, outcome expectations, and goal orientations, which are related but not synonymous elements of the triadic relationship between person, environment, and behavior that are all integral in social cognitive theory (Schunk & Zimmerman, 2006).

Social cognitive career theory (Lent et al., 1994; Brown & Lent, 1996) is derived from social cognitive theory and was developed for use by counselors in career counseling environments. Based on its origins, social cognitive career theory (hereto shortened to SCCT) emphasizes a similar but distinct triadic reciprocal relationship between the social and cognitive variables of: self-efficacy beliefs, outcome expectations, and goal orientations in career cognition and development (Lent et al., 1994). The foundation of the theory is that career development is achieved as a direct result of an individual's engagement with all three variables (Lent et al., 1994). Social cognitive career theory's career interest model (Lent et al., 1994) provides an appropriate

framework within which to explore the relationship of independent researcher identity development to doctoral students' present and future research career interest.

Moreover, SCCT's career interest model deals with the identification of mechanisms through which students' develop interest in their professions, engage in career-relevant choices and behaviors, and realize their academic and professional goals (Brown et al., 1996; Lent et al., 1994). According to Lent et al. (1994), "interests and skills developed during the school years ideally become translated into career selections—although social and economic factors frequently intervene to affect the level and content of choices pursued" (p. 81). This argument is most relevant to the present study because it validates study rationale linking the academic, social and cognitive, and professional socialization experiences of an individual during the context of doctoral study to their future research-career interest and choice. Furthermore, consistent with its origins in social cognitive theory the SCCT perspective focuses on the dynamic and continuous development of an individual's career-related knowledge versus the identification of pre-disposed and static traits (Lent et al., 1994). The major tenets of SCCT are summarized as follows:

- Individuals discard occupational goals based on faulty self-efficacy beliefs or unrealistic outcome expectations.
- The degree of perceived barriers to an occupation is related to the likelihood of an individual to pursue those careers.
- Modification of faulty self-efficacy and outcome expectations can aid individuals in the acquisition of new and more successful experiences and

> increase their persistence towards that occupation. (Brown & Lent, 1996, p. 360)

A good example of these tenets at work in relation to doctoral education was found in Golde's (1998) research that concluded that doctoral students were simultaneously and dually socialized to their role as students (academics) and as professionals (career). Golde argued that as students were learning, they also were transitioning to becoming professionals in their field. Moreover, Golde posited four academic/career socialization-transition tasks and corresponding cognitions typically held by first year students (n = 58). The first task was intellectual mastery, where students were required to develop their competence, usually through coursework. During this time, students asked themselves: "Can I do this?" (p. 56). Based on the first tenet of SCCT, we might infer that this is the point when students are initially exploring their self-efficacy beliefs around meeting the high expectations of a doctoral degree. Schunk and Zimmerman (2006) identified self-efficacy as the "key competence belief in Bandura's theory" (p. 353). A strong sense of self-efficacy will assist students in performing the complex tasks they are likely to encounter in the process of attaining their degree. Conversely, a weak sense of self-efficacy could lead to prolonged ABD or their pre-mature departure. Betz and Hackett (1986) similarly asserted self-efficacy as a factor in career choice. At this early stage of degree progress it is expected that students may not report a high level of salience of independent researcher identity and consequently, may or may not express a high commitment to a future career as a professional researcher.

The second task identified by Golde (1998) was learning about the realities of graduate work. Golde found that as students observed others they gained confidence in their abilities to complete the tasks required of them. Golde asserted this is the stage where students wondered: "Do I want to be a graduate student?" (p. 56). By all accounts (Golde, 1998, 2000; Weidman et al., 2001), the early stages of doctoral study represent a critical juncture. One third of all students leave after the first year (Golde, 1998). At this transition, students possibly were weighing the consequences of having entered doctoral study and continuing to degree completion. An individual's decision to stay or go at this stage may be influenced by their original outcome expectations (Bandura, 1986; Golde, 2000) regarding doctoral study. In the SCCT framework outcome expectations are "personal beliefs about probable response outcomes" (Lent et al., 1994, p. 83). Generally, a person will avoid a behavior if he or she believes the outcome will be negative (Bandura, 1986) or beyond their competency and control (Schunk & Zimmerman, 2006).

Using further application of the SCCT framework, doctoral students with faulty outcome expectations for their program of study such as lack of understanding about the amount of guidance they will receive from a mentor or not being prepared for the heavy emphasis on research (Golde, 1998) also may depart if they believe these things to be barriers they cannot overcome (Golde, 2000). However, in the SCCT framework, Lent et al. (1994) assert that a strong sense of self-efficacy can serve to counter faulty outcome expectations. In the example just provided, doctoral students' reinforced self-efficacy beliefs, derived from successfully performing coursework and early involvement with research experiences, could correct faulty thinking which in turn may help sustain their

later efforts even if initially they are uncertain they could meet the dissertation expectations.

However, some researchers provide the caveat that in ambiguous and loosely structured situations—as in the culture of some doctoral disciplines (Nettles & Millet, 2006), and in environments where quality of performance is not linked linearly to outcomes and motivation, an individual's subsequent behavior may be based solely on outcome expectations which are independent of self-efficacy beliefs (Lent et al., 1994). An example of this would be a highly self-efficacious doctoral student who languishes too long in ABD status or determines the degree will not lead to significant personal reward (e.g., a salary increase) and, therefore, departs despite their previous high levels of performance in the doctoral program.

The third transitional task was learning about the professional expectations of their field. In this task students were most concerned with suitability, therefore, the questions related to this transition were: Do I want to do this work and is this the right choice? It is at this juncture that opportunities for socialization to the intended profession and early exposure to research could be valuable in retaining doctoral students. This is also the phase of graduate student development when an established and effective relationship with one's faculty member can provide much needed support. An effective mentor, through feedback, can be a powerful socially persuasive mechanism to positively encourage students' research self-efficacy and effectively socialize students to the research process (Lent et al., 1994, p. 87).

The fourth task was integrating into the department. Students assessed their fit based on their relationships with others such as faculty, staff, and peers. The defining question was: "Do I belong here?" (Golde, 1998, p. 56). Therefore, formal and informal cues received from peers, faculty, and the professional community were important to increasing students' perseverance (Weidman et al., 2001). However, according to social cognitive theory in the absence of external reinforcements, goal setting can also be an effective strategy (Bandura, 1986; Lent et al., 1994). Goals are an individual's articulated plan to conduct an activity or obtain a particular future outcome (Bandura, 1986). Furthermore, "such concepts as career plans, decisions, aspirations, and expressed choices are all essentially goal mechanisms" (Lent et al., 1994, p. 85). In doctoral study, students use goal setting tools such as developing a plan of study and developing a research proposal to guide their degree progress. Effective goal setting is especially important in the last stages of the degree when students may be isolated from their peers (Ali & Kohun, 2006) while conducting their dissertation research. During this period, setting small and measureable goals with the guidance of their mentors was found to help students to remain self-motivated and increased their self-satisfaction (Fisher & Zigmond, 1998).

Additionally, goals are differentiated according to their degree of specificity and proximal or distal nature (Lent et al., 1994). Therefore, successful mastery of proximal goals during doctoral study may be the most critical component of developing research self-efficacy and consequently independent researcher identity. Overwhelmingly, students expressed entering doctoral study with the remote goal of becoming researchers

(Anderson & Swayze, 1998), however, after certain realities were presented such distal and remote goals did not provide enough motivation or reward to persist (Golde, 1998). In contrast, the positive research experiences and proximal goals students engage in toward the end of degree progress, including goals for completing their dissertation, may better serve to reinforce independent researcher identity and commit students to a research career (Lovitts, 2005). Relating this back to SCCT, earlier and repetitive experiential research opportunities that build on each other may serve to mediate faulty research self-efficacy beliefs and outcome expectations and consequently open students' eyes to previously foreclosed research-career options (Brown & Lent, 1996).

It must be noted, however, that Golde's (1998) transitional tasks and questions were identified in a sample of first year doctoral students only. However, as Hoare (2006) acknowledged adult development is most likely not linear but bi-directional. Also, researchers of student psychosocial development (King, 2005; McEwen, 2005) generally concede that most social and cognitive developmental processes, in students, are not necessarily linear in occurrence; meaning students can experience aspects of personal development over and over and throughout all phases of learning. Therefore, doctoral students may also experience these transitional tasks and questioning at all phases of progress.

Conclusion

Taken together, the social cognitive, social cognitive career and psychosocial development theoretical frameworks create a useful mosaic (King, 2005) to conceptualize how doctoral students are acculturated to doctoral education and research. However,

some perspectives (e.g., andragogy, adult development, and socialization) have been criticized for lacking detailed mechanisms to articulate the role of individual student attributes and moreover, the interactions between specific learning-related variables which promote acculturation. In particular, throughout the literature on doctoral education there has been only limited articulation of descriptive traits and global characteristics that are necessary to become a research scholar. The numbers of studies that have focused on either the process of doctoral students' psychosocial development, social identity transformation, academic self-concept, or individual identity as an independent researcher are insufficient. Moreover, this review of the literature demonstrated that previous studies have mostly emphasized institutional, disciplinary, and programmatic factors. In other words, former research has not extensively sought to specifically assess to what degree doctoral students' self-beliefs; the learning environment of disciplines; and behaviors interact to transition the student from novice to expert researcher.

The present study moves beyond incorporation strategies such as those maximized in the extant socialization based research studies (Gardner, 2008a, 2008b, 2009a; Gardner et al., 2007; Golde, 1998, 2005), to suggest a new research emphasis should be on doctoral students' psychosocial and social cognitive development (Gardner, 2009b) and in particular the distillation of the role of doctoral students' competency beliefs in research career interest. Specifically, to combat the complex issues described in chapter one, the interrelated frameworks of social cognitive theory and social cognitive career theory are posited as theoretical lenses through which to identify potential

mediating variables and contextualize issues related to doctoral students' research identity and research career choice (Brown et al., 1996; Phillips & Russell, 1994).

In conclusion, the four hypothesized study variables: stage of degree completion (SDP), mentor effectiveness (ME), research experience (RE), and research self-efficacy (RSE) are posited to predict the degree of students' independent researcher identification. Based on study findings, doctoral educators could design more individually tailored interventional strategies to nurture students to become researchers and possibly reduce the growing numbers of students' with prolonged time to degree and subsequently help to decrease doctoral student attrition (Lovitts & Nelson, 2000).

CHAPTER III

METHODOLOGY

In this chapter the research questions, research design, procedure of data collection, participants, and methods of analyses that were used in the study are presented. The purpose of this study was to examine the relationship between stage of degree progress, researcher self-efficacy, mentoring effectiveness, and research experience on the amount of independent researcher identification in doctoral students in research based PhD programs in a School of Education at a single research university. A secondary purpose was to investigate the magnitude of the relationship between students' self-beliefs as independent researchers and their future research career interests. The following four research questions and corresponding five hypotheses were used to guide the design of this study:

1. Is there a significant relationship between levels of researcher self-efficacy, mentoring effectiveness, stage of degree progress, and research experience and doctoral students' self-identification as independent researchers?
2. How much of the variance in independent researcher identification in doctoral students, in the School of Education's PhD programs, is accounted for by each of these variables? Which of these variables is a better predictor of independent researcher identity in these students?

3. Is there a significant relationship between self-ratings of independent researcher identity and reported research career interests?
4. Do the researcher mean identity rating patterns and research career interests of doctoral students differ significantly by research experience and stage of degree progress?

Hypotheses

Corresponding to these research questions were five research hypotheses in the study:

1. The model (four combined independent variables) will account for a significant proportion of the variance in independent researcher self-identification (research question #1).
2. Variance in independent researcher identity scores can be uniquely accounted for by one or more of the study's independent variables (research question #2).
3. Doctoral students with high self-ratings on the independent researcher identity scale will similarly report a high interest to pursue academic or professional research career in research (research question #3).
4. Students with some amount of pre-dissertation research experience will report higher self-ratings of researcher identity and research career interest than students with no pre-dissertation research experience (research question #4).
5. Students' amount of researcher identity and research career interest differs significantly by their stage of degree progress (research question #4).

Research Design

Data for this study were collected from 129 students enrolled in a PhD program in a School of Education at a doctoral-granting public university in the Southeastern United States. This study utilized a cross-sectional design, and data were collected using a demographic questionnaire and three scaled instruments. The purpose of this study was to assess the predictive role of four independent variables: (a) stage of degree completion, (b) research self-efficacy, (c) mentoring effectiveness, and (d) research experience, in a sample of doctoral students' perceptions of themselves as independent researchers (i.e., researcher identification). This study also examined if a significant correlation existed between that identification and interest in research careers.

Study Population

Students' perspectives and experiences have been known to be very different by discipline, sub-fields of study and even degree type (Golde, 2005, 2006). Thus the study's focus on a select group of PhD students enrolled in a School of Education within a single university provided an opportunity to examine nuances in students' perspectives from different sub-fields of study within the same profession. Additionally, it contextualized the variables and controlled somewhat for variability that would result from disparate disciplines, institution types, program selectivity, and other environmental differences.

As such, participants were recruited from the doctoral student population of the School of Education at a single doctoral degree granting institution. Specifically, the School of Education (SOE) consists of six departments and offers the Education

Doctorate (EdD) in Educational Leadership. The Doctorate of Philosophy (PhD) is offered by five of the six departments of the school and in four fields: Counseling and Counselor Education, Education Research, Measurement, and Evaluation, Special Education, and Educational Studies with three concentrations: Cultural Studies, Teacher Education and Development, and Higher Education. Enrollment data obtained in the fall of the 2010-2011 academic years listed a total of 331 doctoral students in the school.

According to Tabachnick and Fidell (2007), a sample size should be $N > 50 + 8m$ (where m equals the number of independent variables) for testing multiple correlations, and $N \geq 104 + m$ for testing individual predictors. For the current study, alpha was set at .05, an anticipated effect size of .15 or greater, and the desired statistical power level was .90, therefore, A-priori minimum sample size for this study was computed to be 108 participants (independent predictors = 4).

Data Collection Procedures

The sample population for the study was obtained by soliciting all 331 currently enrolled SOE doctoral students via email and asking them to participate in the study and complete the measurement scales. Prior to survey launch, students received an email message from their respective department chair encouraging their voluntary participation in a fellow student's dissertation research project (see Appendix A). That initial email was followed by three successive emails: an invitation and two follow-ups each a week apart from the researcher (see Appendix B). Each email from the researcher explained the purpose of the study and contained an embedded hyper-link that took respondents directly to the web-based survey. The first page of the survey contained consent

information, previously approved by the Institutional Review Board. The respondents consented electronically by clicking a yes or no response. The survey contained an electronic identification mechanism that allowed each respondent to complete the survey only once. This guarded against duplicate entries and ensured the integrity of the data. The survey was anonymized to keep the identification of survey participants confidential to the extent allowable by the technology. No personal information was collected or included in the final report. An incentive of eligibility to win one of ten Starbucks gift cards ($10 value) was offered.

The study achieved an approximate response rate of 46 %. Initially, 154 individuals began the survey but seven were eliminated based on research criterion (such as non-consent or non-completion of mandatory questions). Complete responses were received from a total 147 doctoral students (EdD and PhD only) for a response rate of 44%. However, a preliminary non-parametric Chi-Square ($x^2(1) = 16.237$, $p = < .001$) indicated that the EdD students ($n = 18$) were significantly underrepresented in the sample (19.5%) as compared to the total population in the School of Education ($N = 92$). Additionally a split files examination (PhD and EdD) of descriptive analyses of the mean scores on the two continuous dependent variables of the study indicated that the respective means and standard deviations of PhD and EdD students on these scales were also very divergent. As a result, the EdD students were excluded from further analyses and the final study sample ($n = 129$) consisted solely of PhD degree seeking students from the School of Education.

Participants

Twenty-eight study participants identified as male (21.7%) and 97 (75.2%) identified as female. The largest percentage (46.5%) of participants were between the ages of 26 and 35, followed by 36-55 (42.6%), over 55 (7%), and 18-25 (3.1%). Racial and ethnic demographics were: White/Caucasian (70.5%), Black/African American (24.0%), Asian/Pacific Islander (4.7%), and other (0.8%). Table 1 illustrates key demographics of the study sample as compared to the total PhD enrolled student population in the School of Education.

Data on enrollment statuses also were collected and recorded. Eighty-nine (69%) of the participants were identified as full-time (defined as 6 credits or more per semester) students. Eighteen (14%) identified as part-time (defined as less than 6 credits per semester) students. Twenty (15.5%) were enrolled in Dissertation only credits. In addition, the participants were from all five departments of the school, seven fields of study, and varying stages of degree progress. Table 2 summarizes the data on enrollment statuses in the sample as compared to the total population of doctoral students, enrolled in PhD programs, in the School of Education.

In terms of degree status, 72 (55.8%) indicated they had not completed coursework, 14 (10.9%) indicated coursework was completed but had not taken comprehensive examination, 13 (10.1%) indicated they had taken comprehensive examinations but had not completed a proposal, 5 (3.9%) indicated they completed a proposal but not the dissertation, 20 (15.5%) indicated they were currently working on the dissertation, and 5 (3.9%) had completed their dissertation. For the purposes of this

study, these categories were collapsed and mapped to Tinto's (1993) three stages of doctoral persistence (see chapter two) to comprise the independent variable denoting stage of degree progress (SDP). Based on this, 72 (55.8%) of participants were identified as in stage one, 14 (10.9%) were identified as in stage two, and 43 (33.3%) were identified to be in stage three. Table 3 summarizes these data.

Table 1

Sample and Population Demographics

	Study Sample		**School of Education**	
	n	**%**	***n***	**%**
PhD Degree	129	100	239	100
Gender				
Males	28	21.7	89	26.89
Females	97	75.2	242	73.11
Transgender or Other	3	2.4	NA*	NA*
Missing Value	1	.007	NA*	NA*
Age				
18-25	4	3.1	8	2.42
26-35	60	46.5	134	40.8
36-55	55	42.6	171	51.66
Over 55	9	7.0	18	5.44
Missing Value	1	.007	NA*	NA*
Race / Ethnicity				
White/Caucasian	91	70.5	182	54.98
Black/African American	31	24.0	76	22.96
Asian/Pacific Islander	6	4.7	3	.91
American Indian/Alaskan Native	0	0	2	.60
Hispanics of any race	0	0	3	.91
Other/Unknown	1	.8	44	13.29
Two or more Races	NA**	NA**	2	.60
Non-Resident Alien	NA**	NA**	19	5.74

*information is not collected by the School of Education
**information was not collected by the study survey

Table 2

Enrollment Statuses by Department and Field of Study

	Study Sample		School of Education	
	n	**%**	***n***	**%**
PhD Degree	129	100	239	100
Enrollment Status				
Part-time	18	14	39	11.78
Full-time	89	69	206	62.24
Dissertation credits only	22	17.1	86	25.98
SOE Department				
Counseling and Educational Development (CED)	17	13.2	37	15.48
Educational Leadership and Cultural Foundations (ELC)	35	27.1	80	33.47
Educational Research Methodology (ERM)	13	10.1	19	7.95
Specialized Education Services	16	12.4	26	10.88
Teacher Education and Higher Education	48	37.2	77	32.22
SOE Fields of Study				
Counseling & Counselor Education	17	13.2	37	11.80
Education Leadership	7	5.4	76	22.96
Educational Studies (Cultural Studies)	31	24.0	4	1.12
Educational Research, Measurement, and Evaluation	13	10.1	19	5.74
Special Education	14	10.9	26	7.85
Educational Studies (Higher Education Concentration)	18	14.0	33	9.97
Educational Studies (Teacher Education Concentration	29	22.48	44	13.29

Table 3

Degree Statuses and Stages of Degree Progress

Degree Status	***n***	**%**	**Stage of Degree Progress**	***n***	**%**
Not completed coursework	72	55.8	I	72	55.8
Coursework complete but no comprehensive exam	14	10.9	II	14	10.9
Comprehensive exams taken but not proposal	13	10.1	III	43	33.3
Proposal complete but not dissertation	5	3.9			
Working on dissertation	20	15.5			
Dissertation completed	5	3.9			
Total	129	100		129	100

(Stage of Degree Progress was determined using Tinto's (1993) stages of doctoral degree persistence)

Data also were collected on the amount of research experience, not counting dissertation, which was previously acquired. On the survey, respondents were given a choice between none and several other categories that included working as a faculty research assistant, lab assistant, completing a Master's thesis or other as open-ended. Responses in the "Other" category included experience gained from employment, coursework and conducting field and action research. For the purpose of this study, all categories were collapsed and dichotomously coded into two classifications; persons with no previous research experience were coded as a 1 and persons with some previous research experience were coded as a 2. As such, 44 (34.1%) had no previous research experience and 85 (65.9%) had some previous research experience.

Instrumentation

The following instruments were used to measure the variables in this study. Permissions (see Appendix C) to use all copyrighted instruments were obtained from the appropriate authors.

Research Self-Efficacy (RSE; Holden et al., 1999)

Research self-efficacy was measured using the *Research Self-Efficacy* scale (RSE; Holden et al., 1999). The RSE is a 9-item scale designed to be "a measure of self-efficacy that will allow educators to assess the changes in students while participating in research training" (p. 465). Each of the nine items describes a research task (e.g., conducting an effective electronic search of the relevant literature). Participants are asked to rate their level of confidence in performing each task at that specific time based on a 10-point interval scale where: 0 rating equals 'Cannot Do at All,' a 50 rating equals 'Moderately

Certain Can Do,' and a rating of 100 equals 'Certain Can Do.' There are no reversed scored items and Holden et al. put the instrument at an 11th-grade reading level. A total is computed by adding together scores from the 9 items. A low or high score indicates weak or strong research self-efficacy respectively.

The internal consistency reliability of the RSE, reported by Holden et al. (1999) from the pilot study (n = 91), was .94 for both the pre-test and post-test administrations on a sample of Social Work students over a semester of research coursework and research experiences. Additionally, Holden et al. reported that a pre- and post-test factor analyses (principal components extraction) of the RSE yielded a single factor that explained 68% of the variance. Construct validity was tested by correlating multiple a priori pre-test predictions and post administration observed relationships between the RSE and another established scale (*Social Work Empowerment Scale*; Frans, 1993) reported to measure the same construct. Relationships were in the predicted direction. For the current study, the RSE Cronbach alpha coefficient was .93.

***Mentorship Effectiveness Scale* (MES; Berk et al., 2005)**

Mentor effectiveness was measured using the *Mentorship Effectiveness Scale*. The MES is described as a "formal rating scale to provide an efficient, comprehensive, and standardized tool for rating the mentorship experience and especially the effectiveness of the mentor" (p. 68). The MES asks students to rate the perceived effectiveness of the faculty mentoring relationship based on a 12- item six-point agree-disagree format and Likert-type rating scale (0 = Strongly Disagree, 1 = Disagree, 2 = Slightly Disagree, 3 = Slightly Agree, 4 = Agree, 5 = Strongly Agree, 6 = Not

Applicable). The respondents evaluate the extent to which the faculty mentor exhibited each of 12 behavioral characteristics: are accessible, have integrity, possess expertise, are approachable, are supportive and encouraging, provide constructive and useful critique, motivate students to improve, provide direction and guidance, respond to questions, value student's contributions, suggests appropriate resources, and challenges the student (Berk et al., 2005). Scoring is done by summing all 12 items for a total score ranging from 0 to 72. Berk et al. reported that content validity was evaluated by a five member faculty committee and the initial instrument was revised several times until a unanimous agreement by the committee was attained. As far as other psychometric properties:

> The most common indices of item analysis, validity, and reliability computed from sample data cannot be estimated for most scales of mentors' effectiveness. Although a common set of criteria and scale items are administered using standardized procedures, typically each mentor-mentee relationship is unique. The ratings by each mentee are usually based on different role profiles. Hence, the ratings are not comparable and do not have the same meaning. Since a statistical sample of mentor ratings cannot be obtained, validity coefficients and standard indices of internal consistency reliability, such as coefficient alpha, as well as other group-based psychometric statistics, cannot be computed. (p. 68)

In the current study a reliability analysis showed that the MES had good internal consistency the Cronbach's alpha coefficient was .93.

Visual Analogue Scales

Participants' levels of individual independent researcher identity and research career interest were both measured using self-ratings on a single question on the *Researcher Identification Scale (RIS)* and *Research Career Interest Scale* respectively. Both the *RIS* and *RCIS* scales were designed by the researcher using the format of a

visual analog scale (VAS; Cline, Herman, Shaw, & Morton, 1992). Researchers have validated the use of the visual analog scales in clinical settings (Gift, 1989) and also to measure psychosocial factors in individuals (Hasson & Arnetz, 2005). Hasson and Arnetz (2005) describe the VAS as "a simple method for measuring subjective experience" (p. 2), and especially those experiences that vary in exposure and outcomes over time. A VAS usually consists of a 10-centimeter line that is anchored by two extremes of a dimension and provides a global single-item measure of the construct of interest (Hasson & Arnetz, 2005). Cline et al. (1992) developed a version of the VAS scale whereby, respondents indicate their degree of salience to the question or statement by placing a mark across the VAS line at a point representative of the intensity of their feelings at that particular point in time. The scale is scored using a gradated template (2mm intervals from 2 to 98) positioned over the respondent's original item and the respondent's mark is read according to the template scale.

Hasson and Arnetz (2005) tested (n = 805) the interchangeability, reliability, and validity of a using non-validated VAS item as compared to a previously validated five-item Likert index for self-ratings. High correlations (ranging from 0.44-0.94, $p < .001$) were reported between the single VAS and single Likert items measuring the same construct. The strongest correlations (r = .90 -.94, $p < .001$) were found for the single item VAS as compared with a similar Likert item.

> This suggests that both scale types are comparable with regard to (relative) reliability. It also indicates that the VAS may be valid measures, since a strong correlation between related constructs can be assumed to be a sign of criterion-related (concurrent) and construct-related (convergent) validity. (p. 5)

Specifically, the study utilized an Adaptive Visual Analogue Scale (a continuous scale) created by a software program (AVAS; Marsh-Richard, Hatzis, Mathias, Venditti, & Dougherty, 2009). According to the researchers, the AVAS was designed to address the limitations of paper and pencil versions of self-reported graphical rating scales—to standardize the administration and eliminate manual scoring of the scale. Additionally, the AVAS data are importable to statistical packages. Participants rate individual items along a solid line and scoring is done by obtaining the largest percentage of distance from one of two anchors on the line that represent extremes of the trait being rated (Marsh-Richard et al., 2009). The researchers assert that:

> This method of rating is thought to provide greater sensitivity for reliable measurement of subjective phenomena, such as various qualities of pain or mood. This method may be preferred by raters when they perceive their response as falling between the categories of a graduated scale, because it allows more freedom to express a uniquely subjective experience compared to choosing from a set of restricted categories. (p. 2)

Marsh-Richard et al. compared ratings (n = 30) of the computerized AVAS with a traditional VAS paper method and found no significant differences by method of rating. The reported median correlation (r = .92) between 14 items for both forms was strong. For the current study, the two dependent variables were measured by a single question for each and using a scale of 0 to 100 on a VAS type line constructed with a slider bar. Participants indicated their response by sliding the bar along a continuous line that was anchored by two questions.

***RIS* and *RCIS* questions as a measure of the dependent variable.** A single question was constructed on each instrument (*RIS* and *RCIS*) to reflect comparisons of non-achieved (low score) or achieved (high score) researcher identity status. Thus, the questions and anchors were as follows:

Researcher Identification Scale

1. **I consider myself to be an academic or professional researcher [*Commitment and Achieved Identity]***

Does not describe me----------Describes me exactly

Research Career Interest Scale

2. **I plan to pursue a career as an academic or professional researcher [*Commitment and Achieved Identity]***

Does not describe me----------Describes me exactly

In addition to these instruments and scales, a demographic questionnaire was used to collect information on the degree to which the sample was representative of the population of study and the two categorical independent variables: students' stage of degree progress and extent of previous research experiences. All together the two instruments (*MES & RSE*), visual analog scales (*RIS & RCIS*) and the demographic questionnaire comprised the complete survey instrument (see Appendix G)

Data Analysis

The statistical program SPSS 17.0 was used for all data analysis. Descriptive statistics were obtained for the sample. Both Research Question #1 (Is there a significant relationship between levels of researcher self-efficacy, mentoring effectiveness, stage of

degree progress, and research experience and doctoral students' self-identification as independent researchers?) and Research Hypothesis #1 (The model of four combined independent variables will account for a significant proportion of the variance of independent researcher self-identification) were answered using a standard multiple regression with researcher identification (RI) as the outcome (or dependent variable) and researcher self-efficacy (RSE), mentor effectiveness (ME), stage of degree progress (SDP, and research experience (RE) as the four predictors. Regression is the use of correlational data to predict a change in score on one variable based on score of another (Tabachnick & Fidell, 2007). The techniques of standard multiple regression allow for the simultaneous examination of more than one independent or predictor variables on the dependent variable (Tabachnick & Fidell, 2007). In the analysis of Research Question #1, all four independent variables were entered at the same time to test their combined power to predict doctoral students' independent researcher identification.

Multiple regression also allows each independent variable's predictive power to be assessed separately from that offered by all other independent variables (Tabachnick & Fidell, 2007). Therefore, Research Question #2 (How much of the variance in independent researcher identity in doctoral students, in the School of Education's PhD programs, is accounted for by each of these variables? Which of these variables is a better predictor of independent researcher identity in these students?), and the corresponding hypothesis #2 (Variance in independent researcher identity scores can be uniquely accounted for by one or more of the study's independent variables) also were analyzed using multiple regression. The purpose was to determine which independent variable

explained the most variance and what each independent variable added to the prediction of independent researcher identification (dependent variable) that was different from what was contributed by the other independent variables.

Research Question #3 (Is there a significant relationship between self-ratings of independent researcher identification and reported research career interest?) and corresponding hypothesis #3 (Doctoral students with high self-ratings of researcher identity will similarly report a high interest to pursue academic or professional research career in research) was answered using a correlation analysis. Correlation is used to measure the size and direction of an association or relationship between two variables (Tabachnik & Fidell, 2007) for one group. The Pearson product-moment correlation coefficient, *r,* was used to measure the association between the two dependent variables of independent researcher identification (RI) and students' research career interest (RCI). The Pearson *r* is used when the two variables to be correlated with one another are expressed as continuous data (Tabachnick & Fidell, 2007). The *r* coefficient ranges from -1.00 to positive +1.00. A positive r indicates a positive relationship between the variables. An increase in scores on one variable is associated with a similar increase in scores on the other. Conversely, a negative *r* indicates an inverse relationship between the variables. An increase in scores on one variable is likely to have a decrease in scores on the other. Significance for all analyses was set at .05 and no cases had missing values. The + or – before the coefficient indicates the direction of the relationship and the distance of the value to +1.0 or -1.0 indicates the size or magnitude of the relationship (Tabachnik & Fidell, 2007).

Secondary analyses were performed using t tests and ANOVAs to answer research question #4 (Do the researcher mean identity rating patterns and research career interests of doctoral students differ significantly by research experience and stage of degree progress?) and corresponding hypothesis #4 (Students with some amount of research experience will report higher self-ratings of researcher identity and research career interest than students with no pre-dissertation research experience) and hypothesis #5 (Students' amount of researcher identity and research career interest differs significantly by their stage of degree progress). An independent-samples *t*-test will tell you whether there is a statistically significant difference in the mean scores for two groups (i.e. whether participants with no research experience and participants with some research experience differ significantly in terms of their researcher identity and research career interest). Analysis of variance (ANOVA) compares the variability in scores between different groups of an independent variable with the variability within each of the groups being compared (Pallant, 2007). The calculation results in an F. ratio which represents between group variance divided by within group variance. Therefore, a large F ratio indicates more variability between the groups than variability within each group that could be attributed to chance (Pallant, 2007). Although a significant *F* ratio supports the hypothesis that the means are unequal, to ascertain the specific group differences post-hoc tests were included in the analyses.

CHAPTER IV

RESULTS

Once again, the purpose this study was to examine the relationship between stage of degree progress, researcher self-efficacy, perception of mentoring effectiveness, and research experience on the level of independent researcher identification in doctoral students in PhD programs in a School of Education at a single research university. A secondary purpose was to investigate the magnitude of the relationship between doctoral students' level of independent researcher identification and the future research career interests. In this section, the results of data analyses pertaining to the three study research questions and related hypotheses are presented.

Research Questions and Hypotheses

Research Question #1: Is there a significant relationship between levels of researcher self-efficacy, mentoring effectiveness, stage of degree progress, and research experience and doctoral students' self-identification as independent researchers?

Hypothesis #1: The model (four combined independent variables) will account for a significant proportion of the variance of independent researcher self-identification (research question #1).

In this study, the four independent variables were: researcher self-efficacy (extent to which students are confident about carrying out research tasks), mentoring effectiveness (behavioral characteristics and responsibilities of mentors that contribute to

the mentoring relationship), stage of degree progress (based on Tinto's (1993) three stages of doctoral student persistence), and previous research experience (students' exposure and hands on experiences with research prior to the dissertation). The first dependent variable was independent researcher identity defined as students' self-identification and self-perceptions as independent scholars and researchers (Bowen & Rudenstein, 1992) and confidence in one's ability to independently conduct research and create knowledge in their disciplines (Gardner, 2008a; Gardner et al., 2007; Lovitts, 2005). The relationship between researcher self-efficacy, mentoring effectiveness, stage of degree progress, and research experience and doctoral students' independent researcher identification was explored using standard multiple regression analyses, with all four independent variables entered simultaneously as the predictors and independent researcher identity as the criterion measure (dependent) variable. Table 4 displays the unstandardized regression coefficients (B), the standardized regression coefficients (β), and standard error for each independent variable. The regression analysis revealed that the model significantly predicted independent researcher identification F (4, 129) = 23.205, $p < .001$, with R^2 at .428 and adjusted R-squared was .41. Altogether, almost 43% (41% adjusted) of the variance in scores on the independent researcher identity visual analog scale was predicted by the combination of research self-efficacy, mentoring effectiveness, stage of degree progress, and research experience. Therefore, the research hypothesis stating that the four independent variables, as a model, would significantly predict independent researcher identity was supported. Table 5 displays the means, standard deviations, and inter-correlations for each variable.

Table 4

Standard Multiple Regression Analysis Summary for Four Independent Variables Predicting Independent Researcher Identification

Variable	B	*SEB*	β
Research self-efficacy	0.96	.012	.604*
Mentorship effectiveness	.277	.152	.127
Stage of degree progress	1.129	1.907	.043
Research Experience	5.350	3.579	.106

Note. R^2 = .428 (*N*=129, *p < .001)

Table 5

Means, Standard Deviations, and Inter-correlations for Independent Researcher Identification and Four Predictor Variables

	M	*SD*	1	2	3	4
Independent Researcher Identification Measure	67.2	24	.637	.115	.219	.177
Predictor Variable						
1. Research self-efficacy	701	150.57	--	.017	.324	.160
2. Mentorship effectiveness	52.3	10.99		--	-.080	-.175
3. Stage of degree progress	1.7	.92			--	-.087
4. Research experience	1.6	.47				--

p < .05

Question #2: *How much of the variance in independent researcher identification in doctoral students, in the School of Education's PhD programs, is accounted for by each*

of these variables? Which of these variables is a better predictor of independent researcher identity in these students?

Hypothesis #2: Variance in independent researcher identity scores can be uniquely accounted for by one or more of the study's independent variables (research question #2).

In order to evaluate each of the four independent variables for their individual contribution to the variance in independent researcher identification, standardized coefficients from the standard multiple regression were compared (see Table 4). Beta values for each variable revealed that research self-efficacy ($t = 8.219$, $p < .001$) made the strongest and only statistically unique contribution; the beta coefficient was .604. The other three independent variables did not make a significant unique contribution to researcher identification ($p > .05$). Squaring each variable's part-correlation revealed that variances in independent researcher identification accounted for by each of the independent variables were as follows: research self-efficacy (31%), mentorship effectiveness (1.5%), research experience (1.04%), and stage of degree progress (0.0016%). The finding of research self-efficacy as the sole unique and significant contributor to independent researcher identity supports the second study hypothesis that one or more of the variables would be identified as a significant predictor to independent researcher identity.

Research Question 3: Is there a significant relationship between self-ratings of independent researcher identification and reported research career interest?

Hypothesis #3: Doctoral students with high self-ratings on the independent researcher identity scale will similarly report a high interest to pursue academic or professional research career in research (research question #3).

The relationship between the two dependent variables: independent researcher identification (as measured by a single question on a VAS scale from 0 to 100) and students' research career interest (as measured by a single question on a VAS scale from 0 to 100) was explored using the Pearson product-moment correlation coefficient. The two items were moderately and positively correlated, r (129) = .43, $p < .001$. Thus, the third hypothesis was supported in that high self-ratings on researcher identity were positively associated with high self-ratings on research career interest.

Secondary Analyses

A second standard multiple regression analysis was performed using the four independent variables to predict Research Career Interest (RCI)—the second dependent variable. The regression analysis revealed that the model significantly predicted research career interest F (4, 129) = 3.854, $p < .05$, with R^2 at .111. Altogether, only 11% of the variance in scores on the research career interest visual analog scale was predicted by the combination of research self-efficacy, mentoring effectiveness, stage of degree progress, and research experience. Of these four variables, research self-efficacy made the largest and only significant unique contribution ($\beta = .26$, $p < .05$).

Research Question #4: Do the researcher mean identity rating patterns and research career interests of doctoral students differ significantly by research experience and stage of degree progress?

Hypothesis # 4: Students with some amount of pre-dissertation research experience will report higher self-ratings of researcher identity and research career interest than students with no pre-dissertation research experience (research question #4).

Follow-up analyses were performed on the data to answer research question #4 in order to ascertain if any significant differences existed between groups of students, in the sample, on the two continuous dependent variables in the study which were researcher Identification (RI) and research career interest (RCI). In all tests, the level of significance was set at $p < .05$. Independent samples t-tests were used to investigate means for the dichotomously coded (labeled groups 1 & 2) independent variable - research experience (RE). Similarly, one-way analysis of variance (ANOVA) tests were used for the levels (labeled level 1, 2, & 3) on the independent variable - stage of degree progress (SDP).

First, independent-samples *t*-tests were used to compare the mean scores on the study's two dependent variables (independent researcher identification—RI and research career interest—RCI) of two dichotomously coded groups based on the independent variable research experience (RE): students with no previous research experience (group 1) and students with some previous research experience (group 2). There was a significant difference in mean scores for the two groups: group 1—students with no previous research experience ($M = 61.31$, $SD = 26.32$) and group 2—students with some previous experience $M = 70.23$, $SD = 22.26$; $t\ (127) = -2.024$, $p < .05$ on the variable of independent Researcher Identification (RI).

In addition, the degree of association between these two variables or effect size was calculated. According to Cohen (1988), "effect size" describes the magnitude to

which a phenomenon is present in the population. Commonly accepted values and interpretation guidelines, proposed by Cohen (1988), are described as small ($\eta^{2 =}$ .01), moderate ($\eta^{2 =}$ .09), or large ($\eta^{2 =}$ .25) effects. For the current study, using Cohen's (1988) standards, the magnitude (mean difference = -.8.91, 95%CI: -17.6 to -.19) was small as eta squared (η^2) = .17. A second independent t-test also revealed a significant difference in scores for the two groups: group 1 - students with no previous research experience (*M* = 58.54, *SD* = 34.96) and group 2 - students with some previous experience *M* = 71.8, *SD* = 28.1; *t* (72.4) = -2.176, *p* < .05 on the second dependent variable of Research Career Interest (RCI). However, the magnitude of the differences in means (mean difference = -.13.25, 95%CI: -25.39 to -1.11) on RCI was also small, eta squared (η^2) = .20. Both significant t-tests support the fourth study hypothesis that research identity and career interest varies based on research experience. Table 6 summarizes the independent samples *t*-tests results.

Table 6

Group Differences on Independent Researcher Identification and Research Career Interest by Research Experience (N = 129)

	Some Research Experience		**No Research Experience**			
Variable	***M***	***SD***	***M***	***SD***	***df***	***t***
Researcher Identity	61.31	26.32	58.54	34.96	127	-2.024*
Research Career Interest	70.23	22.26	71.80	28.11	72.4	-2.176*

*p < .05.

Research Question #4: Do the researcher mean identity rating patterns and research career interests of doctoral students differ by research experience and stage of degree progress?

Hypothesis #5: Students' amount of researcher identity and research career interest differs significantly by their stage of degree progress (research question #4).

To test hypothesis number five, ANOVA tests were performed to compare mean scores based on three levels (level 1, 2, & 3) of the variable stage of degree progress (SDP). For the purpose of this study, the variable SDP is based on Tinto's (1993) stages of doctoral student persistence and consists of stage one (level 1) called transition, stage two (level 2) considered to be the years up to candidacy, and stage three (level 3) which goes from candidacy to dissertation defense. The first ANOVA revealed a significant difference but small effect in Independent Researcher Identification (RI) across all three stages of degree progress ($F = 3.718$, $df = 2/126$, $p < .05$, $\eta^2 = .055$). A higher degree of Independent researcher identification (RI) was reported by students in stage two ($M = 74.42$, $SD = 16.24$), followed by students in stage three ($M = 73.23$, $SD = 21.72$), and students in stage one ($M = 62.18$, $SD = 25.56$). Results from the Tukey HSD post-hoc procedure ($p < .05$) revealed that students in stage one ($M = 62.18$) differed significantly from stage three ($M = 73.23$) only. The second ANOVA revealed no significant differences in Research Career Interest (RCI) across all three stages of degree progress ($F = .159$, $df = 2/126$, $p > .05$). Hypothesis number five was supported for independent researcher identification but not for research career interest. Table 7 summarizes both ANOVA tests results.

Table 7

Univariate Analysis of Variance F Ratios for Researcher Identity and Research Career Interest by Stage of Degree Progress (N = 129)

	Stage One		Stage Two		Stage Three		ANOVA	
Variable	***M***	***SD***	***M***	***SD***	***M***	***SD***	***F*(2, 126)**	η^2
Researcher Identity	62.18	25.56	74.42	16.24	73.23	21.72	3.72*	.06
Research Career Interest	68.06	30.96	69.64	29.71	65.18	32.45	.159	.25

Note. η^2 = effect size. *$p < .05$

Summary

This chapter reported the findings for the study's four research questions and five research hypotheses. Descriptive statistics were reported for demographic information and for the independent and dependent variables. After describing descriptive statistics for the sample population, statistical analyses were reported for each research question and corresponding research hypothesis. First, multiple regression was used to answer research questions numbers one and two. The results confirmed the study hypotheses that the combination of four variables: research self-efficacy, mentoring effectiveness, stage of degree progress, and research experience would significantly predict variance in the level of independent researcher identification of study participants. Furthermore, results suggest that in particular research self-efficacy significantly and uniquely contributes as a predictor. Second, by using a Correlation analysis to answer the third research question,

the researcher was able to confirm that there is a moderate and positive association, but small effect, between independent researcher identification and research career interest.

Finally, employing secondary analyses techniques, results also indicated that there were significant differences in participants' researcher identification and research career interest (dependent variables) by three stages of degree progress (independent variable) and having research experience (independent variable). Two separate independent-samples post-hoc t-tests found a significant effect by none or some research experience in both independent researcher identification and research career interest. The magnitude of effect was larger for the variable of research career interest than for independent researcher identification. In addition, two between-groups ANOVA were performed to compare mean scores on both dependent variables based on three stages (level 1, 2, 3) of degree persistence (Tinto, 1993) comprising the independent variable of stage of degree progress. The ANOVA revealed a significant main effect by stage of degree progress for researcher identification. Post hoc results indicated a significant difference between stage one and three only. Therefore, the hypothesis that students' scores on researcher identity and research career interest would vary by stage of degree progress was supported for independent researcher identification but not for research career interest.

CHAPTER V

DISCUSSION

Over the last decade, doctoral education has garnered significant national attention (Council of Graduate Schools, 2010; Wendler et al., 2010). In particular, there have been increasing concerns regarding growing disparities between the PhD's traditional purposes in relation to its current outcomes and the career pursuits of graduates (Austin, 2002; Bowen & Rudenstein, 1992; Golde & Dore, 2001; Kwiram, 2006; Wendler et al., 2010). Some have been emphatic that the production of researchers is the tacit purpose and most consistent utility of the PhD degree (Berelson, 1960; Golde, 2006; Kwiram, 2006). Across disciplines, scholars agree that becoming an independent academic or professional researcher is the most commonly identified transition and promoted disposition of a PhD graduate (Gardner et al., 2007; Lovitts, 2005). Yet, attempts at conceptualization and examination of learners' identification as researchers have been severely limited to the realm of scientist identities, usually in relation to race or gender (e.g. Carlone & Johnson, 2007; Brickhouse & Potter, 2001; Haraway, 1988) and most typically in the science, technology, engineering and mathematics (STEM) fields of study. In general, there is a lack of research that situates students' researcher identification in non-scientist environments. Thus, the target population selected for this study was students pursuing social science based PhD degrees within the discipline of Education.

Individuals' self-beliefs are critical to their academic achievement and motivation (Pajeres & Schunk, 2005) and to their academic and professional identity (Hall & Burns, 2009; Henkel, 2005). Although, education PhD students are expected to have a collective responsibility to use research to advance the discipline and national education enterprise (Austin, 2002; Stacy, 2006), almost no empirical research exists on whether or not "independent researcher" is an identification that is familiar to doctoral students in education fields of study and if so what contributes to its development. Therefore, this study was concerned with investigating four socio-cognitive variables that were hypothesized to contribute to salience of independent researcher identity in students pursuing a PhD in education fields of study and furthermore, and to investigate any relationship between such an identification and their interest in academic or professional research careers.

Specifically, the study examined the relationship between stage of degree progress, researcher self-efficacy, mentoring effectiveness, and research experience on the independent researcher identification in doctoral students enrolled in PhD programs, in a School of Education at a single research university. A secondary purpose was to investigate the magnitude of the relationship between perception of independent researcher identification and students' future research career interests. This chapter reviews the study's major findings, discusses its limitations and significance, and then concludes by identifying implications for theory, practice, and research.

Overview

Together as an group, the posited model consisting of four variables: research self-efficacy, stages of degree progress, mentoring effectiveness, and research experience was found to significantly predict researcher identification in PhD students enrolled in various fields of study within the School of Education. Out of these four posited predictors, research self-efficacy was found to be the single statistically significant and unique contributor to the variance in scores on the measure of independent researcher identity, measured using a visual analog scale. A related study finding was that researcher identity scores were moderately and positively correlated with research career interest as measured by another visual analog scale.

Separate secondary analyses performed on the data also showed significant main effects between group means, categorized by research experience and three stages of degree progress, on the study's two dependent variables of interest: independent researcher identification and research career interest. In particular, the researcher identity rating patterns and research career interests of doctoral students varied by presence or absence of research experience and also by whether students were at the beginning or advanced stage of degree progress. The most notable findings were with regard to stage of degree progress. Significant effects were found between students in stage one and stage three on researcher identification, but interestingly no significance was found, using the stage of degree criteria, for mean scores indicating students' research career interest. In this next section, the research questions along with corresponding findings are interpreted and discussed separately.

Research Question #1: Is there a significant relationship between levels of researcher self-efficacy, mentoring effectiveness, stage of degree progress, and research experience and doctoral students' self-identification as independent researchers?

Hypothesis #1: The model (four combined independent variables) will account for a significant proportion of the variance of independent researcher self- identification.

The major finding of this study was a significant overall regression model indicating that the set of four variables, research self-efficacy, mentoring effectiveness, stage of degree progress, and research experience, together accounted for 42.8% of the variance in independent researcher identity, as measured by a visual analog scale. This suggests that a combination of students' efficacy beliefs regarding research, interactions in mentoring relationships, experience with research, and stage of learning taken together contribute to their self-beliefs as independent researchers. Unfortunately, there was no current research found in the literature that had previously evaluated this exact set of factors for direct comparison.

Although this study's innovation was to evaluate these variables as a single model, the results are consistent with previous research on the value and independent contributions of each of these predictor variables to the educational success of doctoral students. For instance, recent literature has promoted the use of identity theories to examine the experiences of Education doctoral students (McAlpine & Amundsen, 2008) and in particular to evaluate the mentoring relationship (Hall & Burns, 2009). Previous studies have found that research self-efficacy is important to maintaining students research career interests and productivity (Forester et al., 2004; Holden et al., 1999;

Maher et al., 2004; Phillips & Russell, 1994); many researchers have found that mentoring effectiveness is related to degree completion and other doctoral outcomes (Berk, et al., 2005; Ferrar de Valero, 2001; Maher et al., 2004; McAlpine & Norton, 2006; Seagram et al., 1998); stage of degree has been linked to persistence (Golde, 1998, 2000; Tinto, 1993; Lovitts, 2008); and finally studies that research experience provides doctoral students with social learning opportunities to develop and practice research skills (Maher et al., 2004; Phillips & Russell, 1994).

The study model was significant. However, much of what characteristically contributes to independent researcher identity in the sample remains unexplained. It must be noted that the overall association was small (R^2 = .18) by statistical standards (Cohen, 1988; Tabachnick & Fidell, 2007) as this represents only an effect size of 18%, leaving much of the total variance in scores on independent researcher identity unaccounted for. Such small effect sizes are not uncommon in social science research, especially studies of education, because they typically involve theoretical, latent, and unobservable variables (Tabachnick & Fidell, 2007). Furthermore, an individual's identity is highly complex, is based on multiple influences, and is not static (Erikson, 1968); therefore, it would be difficult for a single model to represent the totality of its components.

The self has been posited to be the direct result of an individual's internal integration of community values and attitudes (Mead, 1934, 1964). Given this, it is not possible that the exact composition of factors influencing self-beliefs and a specific identity is predictable by any single or finite combination of empirical indicators. Moreover, the concept of independent researcher identity is probably not optimally

explained by a linear relationship such as that estimated by a standard multiple regression analyses. The researcher acknowledges that a comprehensive understanding of the nature of the relationship between these variables and students' self-beliefs regarding research is beyond the scope of such simple techniques and a solely statistical analysis.

Nevertheless, the study's findings lend support to the current literature that suggests that to become an independent researcher is an implicit goal of individuals pursing the PhD degree and also suggests that adoption of this type of self-reference is more likely to be predicted, to a degree, by some permutation of these four variables during doctoral study. Thus, if in academia identities are generated, built, and reinforced by the discipline, department, and program (Austin, 2002; Henkel, 2005), and must be negotiated by doctoral students (Hall & Burns, 2009), and whereby an explicit orientation toward research is considered to be a potential differentiating aspect between the PhD versus EdD in education fields of study (Baez, 2002; Schulman, Golde, Conklin Bueschel, & Garabedian, 2006), then this finding could lend support to more recent arguments for the utilization of identity development frameworks with Education PhD students (Hall & Burns, 2009). Therefore, this finding expands current knowledge and offers graduate educators a future building block to explore more complex combinations of factors with increased potential for explaining doctoral students' identity development.

Question #2: *How much of the variance in independent researcher identification in doctoral students, in the School of Education's PhD programs, is accounted for by each of these variables? Which of these variables is a better predictor of independent researcher identity in these students?*

Hypothesis #2: Variance in research identity scores can be uniquely accounted for by one or more of the study's independent variables.

The categorical variables of research experience and stage of degree progress are invariant and therefore cannot be used to explain variance in the outcome variable (Issac & Michaels, 1995). However, in the model research self-efficacy was found to be the single significant and unique contributor to the prediction of independent research identity. This is consistent with previous research suggesting that research self-efficacy is highly related to doctoral students' research career interest and persistence (Forester et al., 2004; Maher et al., 2004; Seagram et al., 1998) and students' research productivity (Brown et al., 1996; Holden et al., 1999; Phillips & Russell, 1994; Holden et al., 1999).

Self-beliefs are vital to academic achievement and motivation (Pajeres & Schunk, 2005). Moreover, the self-efficacy construct has been identified by its theorist (Bandura, 1977, 1986) and demonstrated by several researchers (Pajeres, 2002; Pajeres & Schunk, 2005; Schunk & Pajeres, 2004; Schunk & Zimmerman, 2006) to be a stable component in the social cognitive (Bandura, 1977) and social cognitive career (Brown et al., 1996; Lent et al., 1994) theoretical framework selected for this study. This solitary finding affirms the selection of self-efficacy as a study variable over other similar constructs (e.g. self-concept) because of its emphasis on an individual's cognitions regarding competency and mastery.

Also, within a specified domain or task, self-efficacy is a very consistent and stable construct (Bandura, 1997) and is particularly useful for explaining behavior in educational contexts (Bong & Clark, 1999; Maddux, 1995; Pajeres, 1996). For instance,

the influences of an individual's self-efficacy beliefs have been found to be highly predictive of academic achievement and performance (Schunk & Pajeres, 2004) as well as persistence (Maddux, 1995). Self-efficacy beliefs also play a significant role in an individual's career aspirations (Bandura et al., 1996; Hackett, 1995, Lent & Hackett, 1987; Lent et al., 1994).

Within social sciences, "self-efficacy with respect to conducting research is critical" (Forester et al., 2004, p. 3). Thus, doctoral students with high efficacy beliefs in their performance of research tasks, as measured by the instrument in this study, also would have high assurances of themselves as independent researchers and conversely students with low self-efficacy regarding research capabilities and competencies would not. Furthermore, it is possible that in education fields of study three of the four major sources for the development of personal self-efficacy: (1) performance or mastery experience, (2) vicarious learning, and (3) social persuasion or feedback of others work particularly well to produce the emphasis on research self-efficacy, which was the efficacy domain of measure.

First, task performance and mastery are highly valued in obtaining the PhD as evidenced by the very specific and universal requirements (e.g. examinations and dissertation) for the degree across all departments in this and other institutions. As discussed, much of the learning strategy in PhD preparation has been on mastering the habits of mind and developing the competencies and skills of an independent researcher (Gardner, 2008a; Gardner et al., 2007; Golde, 2006; Golde & Dore, 2001; Holden et al., 1999; Kwiram, 2006; Lovitts, 2005, 2008). Task performance and mastery reinforce

competence beliefs (Bandura, 1977, 1997). In higher education, competence has been regarded as a major task in college students' identity formation (Chickering, 1993). Since items on the measure of research self-efficacy emphasizes the high or low competence beliefs of doctoral students in conducting independent research tasks (Holden, et al., 1999), it follows that the strength and magnitude of those personal beliefs would be a powerful predictor of personal identification as an independent researcher.

Second, vicarious learning from others is a critical part of the socialization and acculturation process of all graduate students to their discipline and profession (Weidman & Stein, 2003), but may be even more valuable to doctoral students (Mullen, Fish & Hutinger, 2010). Learning is optimized when it is a part of a social process (Bandura, 1977; Mullen, 2003; Mullen et al., 2010; Wenger, 1998). Self-efficacy is actually enhanced when there are opportunities to learn from the vicarious experiences of peers and others similar to themselves (Bandura, 1997; Schunk, 1987). In doctoral study this model similarity may be found with both peers and faculty (Stalker, 1991; Mullen et al., 2010; Weidman & Stein, 2003). The findings of this study suggest that perhaps constant interactions with peers and faculty, of similar backgrounds, not only help students learn how to emulate successful research behaviors, but it may also influence their efficacy beliefs that they can achieve becoming the same type of person as modeled by their faculty mentors—an independent researcher (Maher et al., 2004; Seagram et al., 1998).

It is also possible that students pursuing a PhD in education may have more opportunity for vicarious learning than PhD students in other disciplines. It may be that, since education faculty usually were formerly practitioners in their respective fields,

education PhD students, for whom professional work experience is often required as a pre-requisite to their admission (Schulman et al., 2006), easily find a similarity with their faculty. This similarity of background and dedication to the education enterprise could go far in supporting their personal beliefs that they too can persevere and make the same successful transition to academic researchers as their faculty role models. Additionally, since it has been argued that Education students typically enter doctoral study at later life stages than their counterparts in other disciplines, with a reported median age upon completion of 43 (Schulman et al., 2006), in reality the education faculty role models often also are students' direct peers, similar in both age and prior professional experience.

Third, self-efficacy can be influenced through social persuasions and feedback received from perceived experts and significant others (Pajeres, 2002). In the present study, social persuasions may be especially relevant to the significant finding of research self-efficacy. For instance, 69% of the sample participants were full-time PhD students. Full-time students may be considered to have more frequent access and interactions with their faculty mentors and to peers than part-time students. Feedback from teachers can positively or negatively impact learners' academic self-efficacy (Lent et al., 1984; Pajeres, 1995) and career aspirations (Bandura et al., 1996; Lent et al., 1994). As mentioned in the introduction, full-time doctoral students often serve as research and graduate assistants to faculty. In that role they have supervised iterative opportunities to develop and master research skills, a situation that is most similar to their counterparts in the laboratory sciences. Maybe such close proximity to faculty provides them with ample opportunities for feedback and reinforcement on their potential as future researchers (Hall

& Burns, 2009; Maher et al., 2004; Seagram et al., 1998). In addition, full-time doctoral students who are often co-located in an office or workroom have more opportunities to talk to each other and reinforce each other's educational and career choices. Such co-location and increased interactions undoubtedly provide doctoral students a forum to share valuable heuristic knowledge about successfully conducting research to complete the dissertation and on how to become a researcher (Mullen, 2003; Stalker, 1991).

As discussed throughout this paper, the PhD implies credibility as a researcher and is used for professional advancement (Komives & Taub, 2000). Thus, students enter these programs internally and externally motivated by their personal beliefs that the degree will prepare and certify them to be capable researchers and help to advance their higher education careers (Komives & Taub, 2000). During the process, the opportunities for mastery, vicarious learning from similar peers and social feedback they receive about their performance from faculty mentors may strongly influence their academic identities (Hall & Burns, 2009; Henkel, 2005) as well as their adjustment, coping, and persistence (Baird, 1990; Berk et al., 2005; Bieber & Worley, 2006; Golde & Dore, 2001) toward becoming independent researchers.

As previously defined, self-efficacy is based an individual's competency beliefs in relation to performing a task or participating in an activity (Pajeres & Schunk, 2005). The self-concept construct includes self-efficacy, although it is thought to be more personally descriptive and based on affective feelings and more self-evaluation (Pajeres, 1996; Pajeres & Schunk, 2005). After consultation with a subject expert, self-efficacy was selected as the study variable over self-concept based on its "stability and

generalizability when it is used to assess transferable skills or assessment of component skills" (D. H. Schunk, personal communication, September, 29, 2009) such as the task specific skills required to conduct research independently. In contrast, self-concept, while also involving cognition, has been found to be less predictive and explanatory of behavior due to its vulnerability to affective responses inherent to the individual (Bong & Clark, 1999).

However, since self-efficacy is a component of an individual's self-concept (Pajeres & Schunk, 2005), it must also be considered in light of the study findings. Both of these constructs may have been unintentionally operationalized in the study. That is to say, the data obtained in this study appears to suggest that high or low belief in one's capabilities to do research are similarly predicting related outcomes in self-identification, including how capable students believe they are of conducting research independently (self-efficacy) and inadvertently also how they believe significant others perceive them (self-concept). Nonetheless, the study's finding of research self-efficacy as the single variable that most uniquely explains and predicts students' self- identification as independent researchers is affirmation of its critical inclusion, and the factors that promote its development, in strategies for the social and cognitive development of PhD students.

Mentorship Effectiveness

Most notable, in this study, was that the variable of mentorship effectiveness was not found to be a significant predictor to the variance in independent researcher identity. This absence of significance was surprising given that, in terms of doctoral study, debates

on the quality and nature of the mentoring and advising relationship are numerous and that mentoring has been linked to multiple positive and negative outcomes in doctoral study such as gender marginalization (Mullen, 2010); learner satisfaction (Berk et al., 2005); timely dissertation completion (Seagram et al., 1998;); and even degree persistence (Tinto, 1993; Maher et al., 2004; Waldeck et al., 1997). As such, the absence of significant finding requires further discussion.

Considering the appeal and substantial literature on the importance of mentorship in doctoral students' educational experiences, the absence of a significant effect in this study suggests that, in the current model, along with measuring the effectiveness of the assigned mentor or advisor, the *Mentorship Effectiveness Scale* (Berk et al., 2005) also may be assessing a facet of independent researcher identity that is similar to another model variable, most likely research self-efficacy. In fact, the correlation between the two independent variables in the regression was .424. It is noted that the brevity of the scale (i.e. 12 items) negates another consideration - possible response pattern bias that researchers attribute to the non-inclusion of reverse coded items (Fowler, 2004).

Item content review has been suggested as a way to analyze the potential conflation of self-belief constructs on a given self-report instrument (Pajeres & Schunk, 2005). A review of the items on the *MES* (Berk et al., 1999) instrument appears to visually and conceptually support that mentoring effectiveness is possibly sharing some explanatory power with research self-efficacy and the instrument may also be capturing students' research self-concept. To provide support for this explanation, mentorship effectiveness can be deconstructed in the context of the previously delineated major

sources for developing self-efficacy (Bandura, 1977; 1986). Also, item content review can demonstrate the known interrelatedness between the self-efficacy and self-concept constructs (Bong & Clark, 1999; Marsh, 1990; Pajeres & Schunk, 2005).

According to Marsh (1990), self-efficacy helps students to develop a frame of reference and usually formulate a self-concept that is directly related to their performance. Furthermore, it is known that researchers (especially novice ones) sometimes operationally conflate self-efficacy and self-concept and often the two constructs behave empirically similar in self-report measures (Pajeres & Schunk, 2005) such as the *RSE* (Holden et al., 1999) and *MES* (Berk et al., 2005) instruments used in this study. Second, given the previous discussions that self-efficacy is enhanced by exposure to opportunities for vicarious learning, contact with role models, and may be influenced by social persuasion and feedback that students' receive from faculty, it is possible that in addition to assessing the effectiveness of the student-mentor relationship, the items are also inadvertently but similarly evaluating the mentor's beliefs about the students' self-efficacy as a researcher and also students self-concept in reaction to their mentor's perceptions.

There may be a hidden element in the mentor's behavior towards students – a latent expectation factor that mentors exhibit based on their perception of the individual student's promise and potential as an independent researcher. Students view their faculty mentors as expert researchers and therefore, may place high value on their interaction and feedback about their own research capabilities. Hence, high or low individual scores, in the present study, may be indicating not only the effectiveness of the mentor but also

reflect the mentor's overall judgment about that particular student's research capabilities (research self-efficacy), as well as how the mentor's subsequent willingness to expend personal efforts to encourage students in scholarly and research oriented activities makes students feel about themselves as researchers (research self-concept).

Forester et al. (2004) found that the underlying dimensions and manifestations of research self-efficacy were difficult to pinpoint even across multiple measures of the construct. Moreover, self-efficacy is thought to be a requisite and powerful component of self-concept (Bong & Clark, 1999; Pajeres & Schunk, 2005). As such, there may be a deeper relationship between the two predictor variables (research self-efficacy and mentorship effectiveness) that was unable to be differentiated by the items on the instrument of selection and which has resulted in an unintended operationalization of mentorship effectiveness in the present study. Perhaps students' responses on items of mentorship effectiveness also reflect mentor influence on their self-concepts as researchers in light of the mentor's behavior towards them. That is to say the absence of unique significance of the mentorship effectiveness variable, despite its validation in the literature, suggests that more than just the perceptions of the effectiveness of the mentor's behavior were being assessed.

The findings also suggest that the true source of students' competence beliefs about research may be more nuanced—to include both self-efficacy (performance beliefs) and self-concept (affective feelings). This leads one to wonder to what extent is the significance of research self-efficacy, in the study, actually attributable to students' own judgments of their capabilities and to what extent it is a reflection of how their mentors'

behavior makes them feel about themselves as researchers. So, along with the effectiveness of the mentor, the *MES* (Berk et al., 2005) as used in this study may have inadvertently provided a mechanism for students to relate how their mentors' behaviors may also serve to positively or negatively reinforce their research self-concept. Given this, it is probable that some of the predictability in students' independent research identity might also be attributable to the subtle messages students receive from their mentors and in turn students may be building their research self-concept from their interactions with their mentor. Berk et al. (2005) may have been alluding to this multi-dimensionality and potential sensitivity to other unsolicited elements in the mentor relationship in their previously stated justification for not providing psychometric properties for the instrument.

Table 8 links items on the *Mentorship Effectiveness Scale* (Berk et al., 2005) with statements representative of the self-efficacy and self-concept constructs. The self-messages reflect how the closely the relationship between the mentorship effectiveness and research self-efficacy variables may have been operationalized in this study to contribute to the absence of significance of the mentorship effectiveness variable in predicting researcher identity in the sample.

Again, from the study findings it is plausible that mentorship effectiveness and research self-efficacy may be influencing each other with research self-efficacy subsuming mentorship effectiveness. Based on the comparisons depicted in Table 8, it is probable that in this study the single significant finding of research self-efficacy as a unique predictor of researcher identity results from it overpowering mentorship

effectiveness. Mentor behavior may also serve to reinforce students' positive or negative self-concept and therefore, identity (Hall & Burns, 2009). Furthermore, Bandura et al. (1996) asserted that the educational expectations of others, more than individual aspirations, were associated with developing and enhancing self-efficacy in academic contexts.

Table 8

Possible Self Messages

Item (*MES*—Berk et al., 2005)	**Possible Self Message**
My mentor was accessible.	I am confident in my relationship with my mentor (self-efficacy).
My mentor demonstrated content expertise in my area of need.	This is not too difficult for me (self-efficacy).
My mentor was approachable.	I am confident in my relationship with my mentor (self-efficacy). I feel good about going to my mentor (self-concept)
My mentor was supportive and encouraging.	I perform well. I can do research. I have good skills (self-efficacy). I am competent and feel valuable as a researcher (self-concept).
My mentor motivated me to improve my work product.	I have the ability to increase my research competency (self-efficacy). My mentor makes me feel good about doing research (self-concept).
My mentor was helpful in providing direction and guidance on professional issues (e.g. networking).	My hard work related to research is rewarded (self-efficacy). My mentor is invested in me as a future researcher (self-concept).
My mentor acknowledged my contributions appropriately (e.g. committee contributions, awards).	I have done well in research activities (self-efficacy). I have strong capabilities and potential as a researcher (self-efficacy). I have good independent research skills (self-efficacy). My mentor thinks I am a good researcher (self-concept).
My mentor challenged me to extend my abilities (e.g., risk taking, try a new professional activity, draft a section of an article)	I can do this if I work hard (self-efficacy). I can be a researcher (self-efficacy). I can become like my mentor if I perform increasingly difficult research-related things (self-efficacy). New and challenging tasks make me feel like an independent researcher (self-concept).

It has been discussed that mentorship expectations plays a major role, through "favorable positioning" (Hall & Burns, 2009), on students' research self-efficacy. So, when study participants answered affirmatively to the items listed in table 8 indicating that their mentor is accessible, approachable, motivating, encouraging and includes them on research projects, it may also be due to the fact that their mentor is rewarding and encouraging them based on their own high expectations of the student and perceived similarities with themselves. This conclusion also is consistent with Hall and Burns' (2009) major contention that traditionally doctoral student mentoring "sometimes privilege students whom mentors deem capable or motivated by providing greater and more extensive opportunities for these students to participate in research and develop critical professional skills" (p. 49) and some other findings (Green & Bauer, 1995) that the perceived potential of students can predict the amount of psychosocial support, career guidance, and research collaboration provided by doctoral advisers.

Finally, this finding also highlights some of the current issues regarding the disparate mentoring and socialization in doctoral education (Golde & Walker, 2006; Lovitts & Nelson, 2000; Mullen, 2003; Mullen et al., 2010; Waldeck, 1997). Previous researchers have argued that there is a lack of transparency (Golde & Walker, 2006; Lovitts & Nelson, 2000) and consistency (Mullen, 2003; Mullen et al., 2010; Waldeck, 1997) in doctoral student mentoring. According to Kwiram (2006), the guiding principles of doctoral education are based on the apprenticeship model. In this tradition, faculty and students are known to seek out each other based on mutually aligned interests and goals, which may be marginalizing today's diverse students (Hall & Burns, 2009;

Mullen et al., 2010). Hall and Burns (2009) posit that students who eventually align their actions with their mentors benefit from increased capital from enacting a similar researcher identity. So it follows that perhaps students' development of independent research self-efficacy could have some relationship to their selection of mentors who will have high expectations for their development of independent skills and as such provide them with expanded opportunities (favorable positioning) to develop their independence as researchers. For their part, faculty may be more inclined to accept as advisees and subsequently are most effective with those students who they already believe have a strong working research self-efficacy and through their behaviors toward these students concurrently reinforce students' research self-concept, research self-efficacy, and research identification.

Research Question 3: Is there a significant relationship between self-ratings of independent researcher identification and reported research career interest?

Hypothesis #3: Doctoral students with high self-ratings on the independent researcher identity scale will similarly report a high interest to pursue academic or professional research career in research.

The study revealed a small (*.16*) association between students reported self-ratings as independent researchers and their expressed interest in research careers. Researchers generally consider effect sizes greater than .33 to be required to have any practical applications (Cohen, 1988; Isaac & Michael, 1995). However, this finding lends support for the growing concern that although the PhD degree and research are tied together, in the case of education PhD graduates that relationship is not translating

effectively to the students' career interest and selection (Richardson, 2006; Schulman, et al., 2006; Stacy, 2006). As previously noted, education PhD programs have a compelling interest to want to ensure that many of their graduates become researchers (Austin, 2002; Richardson, 2006; Stacy, 2006; Jones Young, 2001). For instance, Jones Young (2001) argued that changes to the system of education are more effectively driven by research that indicates specific needs and has been conducted by professionals trained in Education doctoral programs. An expectation follows that such research should be led by doctoral students who are academically prepared to be the stewards of the Education discipline (Golde, 2006; Richardson, 2006; Jones Young, 2001). As such, this study's finding of a small association between research identity and research career-interest should be contextualized.

To begin, career choices are driven by many forces (Brown & Lent, 1996) but on the basis of the tenets of social cognitive career theory, a low association between researcher identity and interest in research careers could be rooted in students' poor identification and weak self-beliefs around conducting research independently. One of the key assertions made about identity by Adams and Marshall (1996) is that "identity enables the recognition of potential through a sense of future possibilities, and alternative choices" (p. 46). The finding appears to suggest that there may be an unfortunate disconnect between doctoral students' identification as researchers and their interest in research careers. According to the tenets of Social Cognitive Career Theory (Brown & Lent, 1996; Lent, Brown & Hackett, 1994), individuals often discard occupational goals based on faulty self-efficacy beliefs or unrealistic outcome expectations. Furthermore, the

theory also posits that the degree of perceived barriers to an occupation is directly related to the likelihood of an individual to pursue those careers. Therefore, this finding would indicate a low likelihood of these students pursuing research careers; an implication of this finding is that PhD programs in Education need to do a better job of managing students' perceptions of post degree career possibilities in research. New or adapted career decision making models, specifically applicable to Education doctoral students, need to be developed.

Since career counseling is rarely promoted to doctoral level students, Education PhD students may not have a good understanding of the career opportunities in research, beyond faculty roles, that are available to them. Some scholars have articulated a failure of education doctoral students to recognize the relationship between research and practice (Richardson, 2006; Stacy, 2006). They often cite students' lack of understanding and appreciation of the personal and public benefits of research careers as a reason for non-research career selection of education PhD graduates (Golde, 2006; Richardson, 2006; Stacy, 2006). Others (Austin, 2002) argue that current PhD education structures fail to prepare students for the contemporary requirements of the academic workplace.

Some researchers argue that because doctoral students are considered to be adults and they typically enter doctoral study at middle age and advanced life stages, aspects of their psychosocial development, such as post degree career planning is not an explicit part of their educational experience (Gardner, 2009b; Hoare, 2006). Thus, a low association between researcher identity and future research career interest may be the result of not explicitly targeting research identity development in the PhD experience and

the aforementioned non-existence of career-development models in doctoral study as whole.

These results also support growing concerns that in particular, Education doctoral students may even be more likely, than their peers in other disciplines, to disassociate themselves from academic research careers because of their initial practice-based career motivations, lack of knowledge about academia, and limited and shallow research experiences during doctoral study (Golde, 1998; 2000; Golde & Dore, 2001; McAlpine & Amundsen, 2008; Richardson, 2006; Schulman et al., 2006; Stacy, 2006). For instance, Austin (2002) notes that often PhD students' experiences as teaching and research assistants are based more on institutional and faculty needs rather than providing a motivating learning experience for students. As a result, Education doctoral students "experience mixed messages about the relative importance of teaching and research" and may become demoralized about faculty and academic research careers (McAlpine & Amundsen, 2008, p. 21). Schulman et al. (2006) in their essay titled *Reclaiming Education's Doctorates: A Critique and Proposal* refer to this as a "research – practice tension" (p. 36). They are emphatic that: "education alone struggles with whether and how to keep research at the center of the PhD. Explanations rage from students' lack of interest in research (or even, dare we say mistrust) to the limited number of funded projects that can support full-time study at schools of education" (p. 27). Therefore, an unforeseen consequence of not paying attention to aspects of their researcher identity as a developmental task may be that education programs are not engendering in their PhD

students a concurrent degree of responsibility to the teaching and research career opportunities of the profession.

Given the present economy, the financial constraints and declining employment prospects may be another moderating factor. The low association between researcher identity and research career interest in this cross-sectional study could also be reflective of the present media saturated reporting of current tight academic labor market trends and deteriorating employment prospects for academic researchers (Wilson, 2010). As a result, today's education doctoral students may be particularly cautious about academic and professional research careers. Regardless of the reason, a low association between researcher identification and research career interest is problematic to our nation because women and minorities are disproportionately over-represented in Education PhD programs (Altbach, 2004; Maher et al., 2004; Jones Young, 2001). Moreover, researchers (Jones Young, 2001) warn that despite increased numbers in doctoral study, women and minorities are underrepresented in the production and contribution of new knowledge and therefore, continued neglect of facilitating their identification as researchers could mean that the current shortages of minority and women academic researchers will continue unabated.

Finally, in this study a single question was used to measure each of these variables. Since size of the correlation increases directly with the variability measurement (Isaac & Michael, 1995), a factor in the finding of a small effect could be explained by the use of a single item to measure each variable. Multiple items and variable measures possibly could improve the measurement of the degree of association between the two

outcome variables (Isaac & Michael, 1995). Also, both the researcher identity and the research career interest variables were measured using the same visual analog scale ranging from zero to 100. Alternatively, perhaps two different measures with variant scales would have better assessed the degree of the relationship.

Research Question #4: Do the researcher mean identity rating patterns and research career interests of doctoral students differ significantly by research experience and stage of degree progress?

Hypothesis # 4: Students with some amount of pre-dissertation research experience will report higher self-ratings of researcher identity and research career interest than students with no pre-dissertation research experience.

Hypothesis #5: Students' amount of researcher identity and research career interest differs significantly by their stage of degree progress.

Both research experience and stage of degree progress had significant main effects in the study. There were significant observed mean score differences between students who had some (M = 70.23, SD = 22.26; t (127) = -2.024, $p < .05$) and no (M = 61.31, SD = 26.32) research experience on the outcome variables of researcher identity and students with no previous research experience (M = 58.54, SD = 34.96) and students with some previous experience M = 71.8, SD = 28.1; t (72.4) = -2.176, $p < .05$ on the second outcome variable of research career interest. However, it was the magnitude of the differences in means (mean difference = -.13.25, 95%CI: -25.39 to -1.11) on research career interest that was largest, eta squared (η^2) = .20. These findings indicate that independent researcher identity and research career interest differs based on students'

experiences doing research. This is consistent with the previous findings of Phillips and Russell (1994) that found research experience and research self-efficacy to be related to students' research productivity and career interest and the follow up analyses conducted by Brown et al., (1996), which confirmed these findings but stratified the sample by gender.

This finding also has implications for the important role research experience could play in doctoral pedagogy: strengthening individual's research skills, building their research self-efficacy, and possibly helping students experience less stress about completing the dissertation. Once again the Social Cognitive (Bandura, 1977) and Social Cognitive Career Theory (SCCT- Lent et al., 1994; Brown & Lent, 1996) frameworks are especially applicable to these findings. Based on its origins, social cognitive career theory emphasizes a similar triadic reciprocal relationship between the social and cognitive variables of self-efficacy beliefs, outcome expectations, and goal orientations in career development. SCCT is derived from social cognitive theory and was developed for use by counselors in career counseling environments. SCCT deals with how individuals' thoughts, beliefs, motivations and persistence toward career goals can be changed despite environmental challenges (Lent, Brown, & Larkin, 1984; Lent et al., 1994) as result of new and positive experiences. A major tenet of the theory is that "modification of faulty self-efficacy and outcome expectations can aid individuals in the acquisition of new and more successful experiences and increase their persistence towards that occupation" (Brown & Lent, 1996, p. 360).

Applying the SCCT lens, education doctoral programs must be willing to consider innovative and incremental ways to expose students to the major tasks of research in order to encourage their strong research identification, increase their research competence, and motivate their career interest. Previous research (Anderson & Swayze, 1998; Golde & Dore, 2001) has shown that, even after completing coursework, including research methodology courses, PhD students often did not feel prepared to conduct independent research. As learners gain valuable experiences, they should move from the margins of participation toward the center and thereby, increase their motivation to engage in the activities of the community (Lave & Wenger, 1991). In the social sciences, early research experiences could include a spectrum of activities that emphasize research relevant activities and practices prior to the dissertation project. For example, within the higher education program at the school of education in this study, the PhD program was recently significantly redesigned to require students to build and demonstrate continuous research competency development. One such innovative change is that the comprehensive examination process now focuses on four intensive dissertation related literature reviews instead of arbitrary questions.

ANOVAs performed to compare mean scores, based on three levels (level 1, 2, & 3) of the variable stage of degree progress (SDP), revealed a significant difference but small effect in Independent Researcher Identification (RI) across all three stages of degree progress ($F = 3.718$, $df = 2/126$, $p < .05$, $\eta^{2} = .055$). Results from post hoc analysis revealed that students in stage one ($M = 62.18$) differed significantly from stage three ($M = 73.23$) only. The second ANOVA revealed no significant differences in Research

Career Interest (RCI) across all three stages of degree progress ($F = .159$, $df = 2/126$, $p > .05$).

These findings are consistent with Tinto's (1993) research on persistence in doctoral education. Again, for the purpose of this study, the stage of degree progress variable is based on Tinto's (1993) stages of doctoral student persistence and consists of stage one (level 1) called transition, stage two (level 2) considered to be the years up to candidacy, and stage three (level 3) which goes from candidacy to dissertation defense. It makes sense to the researcher that in the early stages of doctoral study identification as a researcher would be low as most new students lack the experience, skills, and sufficient knowledge and self-awareness of themselves as researchers (Kluever, 1997). Characteristically, PhD students in the first two years are highly dependent on guidance from their faculty mentors (Gardner, 2009b; Tinto, 1993) in all areas of study including any novice attempts at research.

A preponderance of research argues that doctoral students must successfully transition from consumers to producers of knowledge (Fisher & Zigmond, 1998; Gardner, 2009b; Lovitts, 2005). However, not enough is done to aid that transition from a developmental perspective (Gardner, 2009b; Hall & Burns, 2009). As mentioned before it is a paradox in doctoral study that students sometimes receive less guidance conducting their thesis research and with writing the actual dissertation than almost at any other time in their course of study (Ali & Kohun, 2006). In turn, such isolation may also serve to unintentionally dissuade and discourage them from post-graduate research careers.

Furthermore, these findings also are consistent with researchers' (Baxter Magolda, 1998) arguments stating increased capabilities for self-authorship is closely related to students' progress through their programs of study. Therefore, an implication of these findings is that it is important to focus on developing students as emerging researchers at all stages of their doctoral education experience. Since research self-efficacy was a major predictor, it would be important to build students' research skills continuously and consistently throughout their program of study. Doing so could counteract faulty self-beliefs and improve outcomes for students choosing postgraduate research careers.

Limitations of the Study

Doctoral education in America is a vast and under-examined enterprise (Kwiran, 2006):

> indeed it is remarkable that the PhD program, administered by hundreds of thousands of different individuals in a thousand institutions and in the complete absence of any central repository of rules or a cosmic accrediting agency, remains universally recognizable and extraordinarily stable. (p. 142)

A single school was chosen for this study so that there would be some consistency between the departments in terms of other possible mediating variables such as curricular degree structure and dissertation requirements. As such, this study was limited in trying to capture and empirically measure complex phenomena in doctoral students' experiences. First, the study was restricted by limiting the participants to only PhD students (eliminating EdD), in a single discipline and at one institution. A single institution narrows the scope of the study in that it limits the range of the subjects.

Furthermore, using a single institution and surveying only the selected disciplines resulted in over and underrepresentation of some population demographics. The small size of some of the sub-groups prohibited comparative group analyses of the variables. For example, females were overrepresented in the sample, but the ratio was consistent with numbers in the defined population parameter. Therefore, the experiences of this population may not be representative of the students at other larger programs and different types of institutions.

Additionally, the cross-sectional and correlational design of the study makes it challenging to ascribe meaning. Overall, correlation (non-experimental) designs have lower predictive power (Isaac & Michael, 1995) and a cross-sectional sample only provides a snapshot, and consequently, cannot predict the behavior of students over their entire course of study. A cross-sectional design lends itself to weaknesses in interpretation—it can say only that something is occurring for this particular group of people at this point in time. Thus, it also limits generalization—it is hard to say how these findings would hold up longitudinally. A longitudinal design would be the best way to study the development of a particular identity in students. Also, given that the study relied on self-identification and self-report, the participants' responses are subject to scrutiny based on the halo effect and social desirability (Bausell, 1986; Fowler, 2001). Self-report has no means of verifying the veracity of the data but has been established as an accurate way to solicit information (Fowler, 2001).

The conceptualization of researcher identity may also have presented a limitation for participants. The definition was amalgamated from the literature and not based on a

formal definition and because it was measured using a single question and arbitrary scale it could have been misinterpreted by the respondents. Identity is complex and not static (Berzonsky & Neimeyer, 1994) so we must take into consideration "slippage between the concepts as abstractions and the variables that we use as the informational repositories of their meaning" (Hardy & Bryman, 2004, p. 10). One example, in the present study, was the possible unintended operationalization of the variable of mentorship effectiveness. Finally, the instruments selected have not been tested in large samples and therefore represents a significant limitation to validity of the constructs they are measuring and to the study's application beyond this single institution.

Significance of the Findings

The limited population of a single school of education means this study cannot generalize to all education PhD students across the nation. However, based on its empirical research design it is a sufficient premise on which to make general comparisons (Bausell, 1986) and replicate the findings in other institutional environments. Its major contribution is to provide evidence that independent researcher identification is salient and important for education PhD students and is predicted from an interaction of personal, environmental, and behavioral factors. Although there is growing research based scholarship on doctoral education, much of it has utilized the monolithic theories of socialization which may marginalize some populations of students (Gardner et al., 2007). This study's findings suggest that alternatively social cognitive (Bandura, 1977, 1986) and social cognitive career (Brown & Lent, 1986) theoretical frameworks can be used effectively to help educators understand and demarcate the development of doctoral

students. Specifically, targeting the development of students' research self-efficacy, providing them with early and continuous research experience, and supporting them as researchers in their later stages of degree progress may be critical to how they perceive themselves as independent researchers. This is significant in that professional socialization and not researcher identity development has primarily been the focus of doctoral education retention strategies.

Implications for Practice

On the undergraduate level, the value of intentionally creating education environments that support the identity development of students has been unequivocal (Chickering & Reisser, 1993). Knowledge of the "key principles and ingredients" in educational environments provide educators with the tools to engineer environments that will most significantly impact students development (Chickering & Reisser, 1993, p. 279). Similarly, this study's finding offer some principles and ingredients to improve PhD programs in education fields of study and support doctoral students' researcher identity development.

An implication of this study is that an independent researcher identity is a salient self-description for PhD students in education and that positive identification is predicted by the strength of doctoral students' self-efficacy beliefs regarding performing research tasks. This implies a high return on investment and value in facilitating research self-efficacy development for PhD students. Boyer (1990) argues that in doctoral study "it would be more appropriate to focus on the process of research rather than exclusivity of the topic" (p. 68). Education PhD programs should focus their efforts on providing the

kinds of processes and experiences which promote a strong identification with research in students. Unfortunately, much of doctoral education in the social sciences still consists of a coursework-intensive process, and there is little actual experiential learning about the process of conducting research. Moreover, for some PhD students, especially part-time learners, there are limited pre-dissertation opportunities to link their formal learning experientially with exposure to actual research projects. Students in the social sciences could benefit from a more iterative and practical approach to research similar to their peers in laboratory sciences. In fact, some researchers (Nyquist & Woodford, 2000) argue that often in the social sciences students' dissertations and research are disconnected from real world problems. Additionally, these students conduct their dissertation research in isolation, which is also contradictory to the current trajectory of research funding, which encourages team approaches to capitalize on limited resources (Richard McGee, personal communication, May 6, 2010). As Tinto (1993) comments "isolation, though common, need not occur" (p. 50).

The study's most surprising finding has implications for mentoring doctoral students. With the increasing diversity of the doctoral student population (Waldeck et al., 1997), it is more critical than ever to examine mentor selection, biases, and behavior. The implied assumption of the PhD is that, once enrolled, everyone has the same opportunity to develop into a researcher. However, mentors can be prematurely biased toward students whom they think inherently possess a research acumen and can be ineffective with those they do not believe have what it takes (Hall & Burns, 2009; Waldeck et al., 1997); exposure to research experiences across fields of study are inconsistent (Golde &

Dore, 2001); and some groups of students can become marginalized or isolated during the critical transition to becoming an independent researcher (Ali & Kohun, 2006; Stalker, 1991, Mullen, 2003; Mullen et al., 2010), which is marked by execution of the dissertation and which is often the final and only independent research experience. Arguably, "doctoral education will be improved if conversations about the purpose, mechanisms for, and the particular elements of doctoral education and mentoring become routine and public" (Golde & Walker, 2006, p. 7). Thus, an implication of this study is that doctoral education can be much improved if mentors are encouraged to provide early outreach to all students with the specific goal of improving their efficacy around research, prior to the dissertation.

Furthermore, multiple resources for mentoring should be promoted in doctoral education. For example, doctoral students should be encouraged to view their advanced stage peers as potential mentors. Perry (1998) articulated that a symbol of students' cognitive growth and development is when they recognize that peers can also be subject matter experts. Moreover, peers can help to enhance doctoral student self-efficacy through three of the four primary sources, specifically, by collaborating on research projects (performance), serving as role models (vicarious learning), and providing ongoing encouragement to persist (social persuasion).

Finally, it has been shown that education is one of few disciplines where there is low participation of graduates in research careers beyond the PhD (Richardson, 2006; Schulman et al., 2006; Stacy, 2006). This has serious ramifications for the advancement of the science of the discipline and weakens accountability in the enterprise (Richardson,

2006; Schulman et al., 2006; Stacy, 2006). Therefore, another implication of this study is that it is critical to encourage and motivate doctoral students in developing a strong research career interest. Subsequently, faculty must work with students in more direct and meaningful ways in order to foster environments that will nurture, as well as challenge, and support (Sanford, 1967) them as emerging researchers (Stacy, 2006) and expose them to research career options (Jones Young, 2001).

In general, doctoral programs could improve retention if they became more student-centered (Gardner, 2009b; Golde, 2005). If the PhD's purpose is to develop researchers, then programs should be restructured to yield that result (Stacy, 2006). As Golde and Walker (2006) note, "We could prepare students differently for the work they will do by identifying and developing the kinds of experiences that would efficiently and effectively lead students to become good researchers" (p. 970). Being more strategic about developing students as researchers is a good investment for institutions as current disparities in academic and professional research, especially the underrepresentation of women and minorities (Santiago & Einarson, 1998), only serve to weaken the nation's global competitiveness (Wendler et al., 2010) and more importantly, the Education discipline (Schulman et al., 2006; Jones Young, 2001).

Implications for Theory

The previous practice of attributing the crisis of attrition (Tinto, 1993; Lovitts & Nelson, 2000) in some doctoral disciplines to individual student weaknesses is contrary to the current research (Gardner, 2009b; Golde, 2005, 2006; Golde & Dore, 2001), which points instead to the lack of systemic theoretical frameworks - and non-utilization of

developmental processes in doctoral education (Gardner, 2009b). “We often do not deliberately consider or explicitly articulate our theories and strategies on the pedagogy of research for developing excellent researchers” (Golde, 2006, p. 14). Because PhD study is the critical time to influence students towards careers in research, there is increasing evidence of the value of shifting focus from outcomes to developing theoretically based strategies that emphasize the self-beliefs and identity formation of doctoral students as researchers to guide curriculum and provide better learning experiences for students in education doctoral programs (Hall & Burns, 2009).

The finding of significance of the group of variables in the model and corresponding finding of a unique contribution made by research self-efficacy beliefs to perception of independent research identity also imply support for this researcher’s main argument for the shift from socialization theories to the use of social cognitive frameworks in doctoral student development. The current myopic emphasis on professional socialization has become too monolithic and as a result programs may be marginalizing some of today’s diverse and non-traditional doctoral students. Therefore, it is entirely possible, but is a topic for future research, that a lack of focus on students’ identity development may be contributing to attrition and prolonged ABD.

In particular, an implication of this study is that Social Cognitive Theory (Bandura, 1977) and Social Cognitive Career Theory (Lent et al., 1984) can provide improved frameworks for understanding how doctoral students interact with their educational environment and how those interactions moderate research identity development and research career interest. A major tenet of social cognitive theory is the

reciprocal relationship between individuals' self-beliefs, the social learning environment, and their behavior (Bandura, 1995). This bi-directional relationship, related to self-efficacy, considers individuals to be both artifacts and creators of their environment (Bandura, 1995). Such reciprocal and social learning has been promoted in the literature, especially for racial minority and female doctoral students (Mullen et al, 2010). The authors describe it as "a philosophy of interdependence" that should be encouraged in the "outlook" of doctoral students and faculty (Mullen et al., 2010, p. 181).

Another relevant shortcoming with socialization scholarship is that it is mostly theorized from the perspective of what has not happened and based on deficits in doctoral environments instead of focusing on what has been successfully applied and evaluated for effectiveness. Attrition and ABD phenomena are the most frequently reported disparate outcomes in doctoral education. However, strategies to combat them have been minimal, perhaps because we do not have an appropriate theoretically based understanding, beyond professional socialization, of the ways in which students grow and change in doctoral study. Understanding this could alert educators earlier to individual student dissonance toward the major purpose of the PhD—the production of original research. Perhaps student doctoral degree attrition and ABD is somehow related to premature decisions students have made rooted in weak research self-efficacy, faulty personal beliefs of control, over time a decreased expectation of degree utility, and their own self-concept about their abilities to affect an identity as an independent researcher during their course of study. In other words, even if students were highly capable during coursework their low or high researcher self-efficacy may translate in similar independent researcher

identifications and result in an inability to persist in their original academic and career goals.

In sum, theories of professional group socialization have been the primary lens used to view issues of doctoral persistence and less attention has been paid to deeper processes that could be characterizing the individual experience of doctoral students. Social cognitive frameworks embrace the concept that self-referent influences in the educational environment shape students' self-beliefs and subsequent behaviors. Recalling that researchers (Golde, 2000; Maher et al., 2004; Nyquist & Woodford, 2000) argue that some of the most talented students leave doctoral study in high percentages and that attrition is occurring after significant time and effort in the latter stages of study (CGS, 2010; Golde, 2005), it is surprising that the role of an doctoral students' self-beliefs including research self-efficacy, self-concept, and related outcome expectations have not received more specific literary attention. As a whole social cognition theories, psychosocial, and career development models have not been systematically applied as theoretical frameworks in the scholarship on doctoral students (Gardner, 2009b). The major theoretical implication of this study for theory is that the utilization of psychosocial and social cognitively based theories of identity for doctoral students could enhance our understanding, beyond socialization models, of what shapes the identifications of students in doctoral contexts.

Implications for Research

Most notable in education is the paucity of research, beyond adult learning pedagogy (Hoare, 2006), on how doctoral students acquire heuristic and procedural

knowledge about conducting research (Mullen et al., 2010; Jones Young, 2001) and almost none on their identity development as emerging independent researchers (Gardner, 2008b). Although major changes to doctoral education are being called for (CGS, 2010; Schulman et al., 2006), little empirical scholarship on doctoral student development exists to guide these recommendations. As previously mentioned, past doctoral research focus has emphasized shifting demographics and numerical outcomes (CGS, 2008). Fortunately, there is a growing amount of scholarship around the professional characteristics, early research training interventions, and the role of students' self- beliefs and motivations (Gardner, 2008b; Lovitts, 2005, 2008). Thus, a major implication of this study is that the data appears to suggest that psychosocial, identity, and career development should not only be relegated to the undergraduate years – they are also developmental processes relevant to adult learning, especially in PhD study. For example, the interrelationship between self-efficacy and self-concept that was possibly operationalized in this study suggests that these constructs need further investigation for more clarity. Therefore, future research should investigate their origins, differentiation, and paths within the individual doctoral learner.

Researchers have argued that, in communities of practice (Lave & Wenger, 1991) such as academia, learning is a process of identity formation where one is acquiring those facets that are needed to become the type of professional person one wants to be (Lave & Wenger, 1991). Even so, only a few scholars (e.g. Hall & Burns, 2009) have begun to use identity theories as frameworks for examining effective learning in doctoral study. This study posited and tested a model for predicting variance in education PhD students'

independent research identification. The results of the study show an empirical relationship between a set of hypothesized social cognitive and learning environment variables and education PhD students' identification as independent researchers. Thus, another important implication of this study is that is lends support for arguments that efforts should be made in early stages of doctoral study to cultivate a research orientation and research efficacy in education PhD students (Gardner, 2008b; Jones Young, 2001). However, more research is needed to determine the extent to which identity development strategies are effective, impact student retention and persistence and whether they can make a difference in helping education doctoral students complete their dissertation research more successfully and raise their interest in research careers.

Contrary to its abundance in the literature, the variable of mentoring effectiveness was not found to uniquely contribute to the prediction of independent researcher identity. This finding was attributed to a potential overlapping relationship between research self-efficacy and mentoring effectiveness, but more research in these two areas is also needed. For example, future research should explore how mentor's formal and informal expectations influence the totality of students' self-beliefs and translate into ways in which their doctoral student mentoring is effective or ineffective. Perhaps examining alternate moderating factors to the mentoring relationship such as its role in the development of research self-concept could be a substantial improvement for future studies. For example, in future model building it would be helpful to know how much more useful one variable is over the other by employing multivariate techniques (e.g. stepwise regression) and multi-group analyses (e.g. structural equation modeling) to

explore more precisely the best set of predictors to explain the development of researcher identification and research career interest.

Finally, we need the diverse perspectives of students themselves, which is more effectively gathered by mixed methods and constructivist methodologies (Creswell, 2009). The solely quantitative design of this study is challenging for meaningful generalization across doctoral education. For instance, no feedback was solicited from respondents as to how well the items on the instruments and visual analog statements comprehensively or accurately reflected their feelings. In order to more inclusively determine what contributes to how students perceive themselves as researchers future research would require giving students an opportunity to elaborate on their experience in their own words and identify common themes. Additionally, more longitudinal research on doctoral students is needed to demonstrate development and meta- analyses of accumulated research should be conducted to evaluate the reliability of the instruments of measure.

Conclusions

Acquiring the cognitive skills and personal identification as an independent researcher is believed to be a critical component in doctoral student satisfaction, retention, and degree completion (Gardner, 2008a, 2009b; Golde & Dore, 2001; Lovitts, 2005, 2008). Acquiring the capabilities and disposition of an independent researcher is the stated primary purpose of a PhD in almost any discipline. Although training in research methods is implied in the credentials of the degree, it has been shown that confidence in one's abilities as an independent researcher is not a universal experience.

This study sought to measure some factors that were believed to contribute to doctoral students' perceptions of themselves as emerging independent researchers across fields of study in a single school of Education. Although the study incorporates the popular model of socialization, it fills a gap in the literature by moving beyond the institution and program social culture to conceptualize and contextualize the development of independent researcher identity within a larger psychosocial and social cognitive framework.

Furthermore, according to Chickering and Reisser (1993) establishing identity "leads to clarity, stability, and a feeling of warmth for this core self as capable, familiar, and worthwhile" (p. 50). In Education PhD fields of study, it has been argued that a positive identity transition may be even more critical in order to ensure a cadre of future researchers committed to advancing the science of the discipline and improving the educational enterprise (Gardner, 2008b; Lovitts, 2005, 2008; Richardson, 2006; Schulman et al., 2006; Stacy, 2006; Jones Young, 2001). As such, learning to do research during one's PhD study needs to be less episodic and therefore could be less traumatic for some students, and potentially less demoralizing and marginalizing for others.

In closing, throughout the social sciences we must try to gain a theoretically based understanding of what contributes to the psychosocial needs and cognitive development of doctoral students as independent researchers. Only then can the curricular elements and learning environments of doctoral programs be strategically re-imagined to make that outcome more likely. The findings from this research study suggest that students'

positive independent researcher identification can be facilitated to a small degree by a combination of their research self-efficacy, the effectiveness of the mentoring relationship, having some research experience and their stage of degree progress. Therefore, research identity and research career development needs to become integral to doctoral pedagogies, especially if graduates are expected to be the primary stewards of the Education discipline and carryout the PhD's historic research tradition (Golde, 2006; Schulman et al., 2006; Jones Young, 2001). To accomplish this, we must incorporate more psychosocial and social cognitive developmental approaches to working with doctoral students.

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APPENDIX A

SAMPLE RECRUITMENT EMAIL SENT FROM DEPARTMENT CHAIRS

Copy of Email Sent to Student by Chairs

(*Department*) Doctoral Students:

As a member of our community of scholars and in promotion of a culture of research, I want to encourage you to participate in the research projects of your fellow students. As such, in a few days you will be receiving a request from Cheryll Albold, a fellow doctoral student in the School of Education, asking you to complete a brief on-line survey to gather data for her dissertation research project, which is concerned with improving the educational experience of doctoral students. I hope you will consider participating in this project.

Sincerely,
Department Chair

APPENDIX B

SAMPLE RECRUITMENT EMAIL SENT TO DOCTORAL STUDENTS

Copy of Recruitment Email (First Invitation)

Dear Fellow Doctoral Student:

I am a doctoral student at UNCG in the School of Education. For my dissertation research project I am investigating the independent researcher identification experiences of doctoral students in the school of Education at UNCG. The information from this study could be valuable in gaining insight into the variables that promote or impede doctoral students' development and self-identification as independent researchers. Since you are a registered doctoral student, I would like to invite you to participate in my dissertation research project. Your participation in this research study is voluntary; however, to take part in the study you must be a currently enrolled doctoral student at UNCG in the school of Education.

If you decide to participate in this study, you will be asked to answer questions on a demographic questionnaire and complete an online survey with three short subscales measuring researcher self-efficacy, mentoring effectiveness, and level of independent researcher identification and interest in academic or professional research careers. The survey takes approximately 10 minutes to complete. The survey is anonymous and only aggregate data will be reported or presented in my dissertation; individual identifiers are not being collected.

If you are interested in participating, please follow the survey link below. Please read over the informed consent carefully and click "Yes" to proceed directly to the instrument.

I hope you will consider helping me with my dissertation research.

Thank you for your consideration.
Cheryll Albold, MS.Ed.
Doctoral Candidate
Deborah Taub, PhD
Professor

Copy of Recruitment Email (Second Invitation)

Dear Fellow Doctoral Student:

I am a doctoral student at UNCG in the School of Education. For my dissertation research project I am investigating the independent researcher identification experiences of doctoral students in the school of Education at UNCG. A week ago, you should have received an email asking for your participation in my dissertation research project.
If you were interested in participating and have not done so, there is still time. Your participation in this study is voluntary; however, to take part in the study you must be a currently enrolled doctoral student at UNCG in the school of Education. To participate, please follow the survey link provided below. You will be asked to complete an online survey with three subscales and answer questions on a demographic questionnaire. The survey takes approximately 10 minutes to complete. The survey is anonymous and only aggregate data will be reported or presented in my dissertation; individual identifiers are not being collected.

If you are interested in participating, please follow the survey link below. Please read over the informed consent carefully and click "Yes" to proceed directly to the instrument.

{Insert embedded link once survey is launched}

I hope you will consider helping me with my dissertation research.
Thank you for your consideration.

Cheryll Albold, MS.Ed.
Doctoral Candidate
Deborah Taub, PhD
Professor

Copy of Recruitment Email (Third and Final Invitation)

Dear Fellow Doctoral Student:

I am a doctoral student at UNCG in the School of Education. For my dissertation research project I am investigating the independent researcher identification experiences of doctoral students in the school of Education at UNCG. This will be my final communication email asking for your participation in my dissertation research project. If you have not done so already, I would greatly appreciate your participation. Your participation in this study is voluntary; however, to take part in the study you must be a currently enrolled doctoral student at UNCG in the school of Education. To participate, please follow the survey link provided below. You will be asked to complete an online survey with three subscales and answer questions on a demographic questionnaire. The survey takes approximately 10 minutes to complete. Your responses are completely anonymous. Please read over the informed consent carefully and click "Yes" to proceed directly to the instrument.

I hope you will consider helping me with my dissertation research.

{Insert embedded link once survey is launched}

Thank you for your consideration.

Cheryll Albold, MS.Ed.
Doctoral Candidate
Deborah Taub, PhD
Professor

APPENDIX C

PERMISSIONS TO USE COPYRIGHTED INSTRUMENTS

Cheryll Albold <caalbold@uncg.edu>

Mentorship profile questionnaire developed by the ad hoc faculty mentoring committee.

4 messages

Cheryll Albold <caalbold@uncg.edu> **Sun, Jun 6, 2010 at 4:44 PM**

To: rberk@son.jhmi.edu

Hello:

I am Cheryll Albold a third year doctoral student at the University of North Carolina at Greensboro in the Higher Education Ph.D. program. I recently came across your article titled "Measuring the effectiveness of faculty mentoring relationships" that was published in January, 2005 in the Academic Medicine, 80(1). In the appendix was the questionaire that you developed. Please can you tell me if there has been any further development and use of this questionnaire? I would also like permission to use and cite it in my dissertation research which is on factors that positively contribute to the development of independent researcher identity in doctoral study.

I would greatly appreciate your response to this email or to call me at 336-681-7715.

Thank You,

--
Cheryll Albold, M.S.Ed.
Graduate Research Assistant
Higher Education Program
Department of Teacher Education and Higher Education
The University of North Carolina at Greensboro
(336) 334-3441 (office)
caalbold@uncg.edu

Until there is a critical mass of any given number of students, there is no institutional response; once a group gains a collective identity, the institution recognizes them as such and begins to develop specialized programs and services geared toward that group-----Trow, 1973

Berk, Ron <RBERK@son.jhmi.edu> **Sun, Jun 6, 2010 at 5:46 PM**

To: Cheryll Albold <caalbold@uncg.edu>

Dear Cheryll,

The scale has been reformatted. It can be downloaded as a PDF from my Website (link below) under Publications and also appears in the appendix of my Thirteen Strategies book (see Stylus link below).

You have permission to use the 2 mentoring tools for your dissertation intact or modified for your sample as long as the copyright line appears at the bottom and acknowledgment is given for the source.

I am also attaching an article on mentoring that was just published.

I wish you the best in your research and thank you for your interest in my work. Let me know if I can be of further assistance. I will also be inviting you to join my professional network on LinkedIn so we can keep in touch and you will be given first notice of my new publications. Of course, you can decline.

Best regards,

Ron

Ronald A. Berk, PhD

Professor Emeritus, Biostatistics & Measurement

Former Assistant Dean for Teaching

The Johns Hopkins University

Mobile/E-mail: **(410) 940-7118** rberk@son.jhmi.edu

[Quoted text hidden]

Cheryll Albold <caalbold@uncg.edu> **Sun, Jun 6, 2010 at 7:08 PM**

To: "Berk, Ron" <RBERK@son.jhmi.edu>

OH WOW...thank you so very much for prompt reply and all of the resources. I will accept your invitation and will include the copyright exactly as you have detailed. I may contact you again after my data collection is completed in the late fall.

Most graciously,

Cheryll Albold

[Quoted text hidden]

Berk, Ron <RBERK@son.jhmi.edu> **Sun, Jun 6, 2010 at 7:21 PM**

[Quoted text hidden]

Spartan

Cheryll Albold <caalbold@uncg.edu>

Research Self-Efficacy Scale

2 messages

Cheryll Albold <caalbold@uncg.edu> **Mon, May 24, 2010 at 9:55 AM**

To: gary.holden@nyu.edu

Hello Dr. Holden:

Please allow me to introduce myself. I am Cheryll Albold, a third year Ph.D. student in the Higher Education Program at the University of North Carolina at Greensboro. I am conducting my dissertation research on the development of researcher identity in doctoral students. I am interested in learning more about the Research Self-Efficacy Scale. I would like to obtain a copy and instructions on how to administer and score it. Also, if you have a list of published studies that have assessed its psychometric properties or article related to use of this scale across disciplines that would be helpful.

Additionally, if you would be willing to talk with me via telephone, I would be honored.

Thank you for your time and consideration.

Cheryll

--
Cheryll Albold, M.S.Ed.
Graduate Research Assistant
Higher Education Program
Department of Teacher Education and Higher Education
The University of North Carolina at Greensboro
(336) 334-3441 (office)

caalbold@uncg.edu
Until there is a critical mass of any given number of students, there is no institutional response; once a group gains a collective identity, the institution recognizes them as such and begins to develop specialized programs and services geared toward that group-----Trow, 1973

Gary Holden <gh5@nyu.edu> **Mon, May 24, 2010 at 10:27 AM**

To: Cheryll Albold <caalbold@uncg.edu>

Cheryll:

My standard response:

My process for using our scales is as follows:

1. You should read a few of the background articles from the following list to get a sense of what scale(s) would best fit your needs. All of the items are usually in the article in the tables reporting results.

Holden, G., Barker, K., & Rosenberg, G., & Onghena, P. (2008). The Evaluation Self-Efficacy Scale: A replication. *Research on Social Work Practice, 18,* 42-46.

Holden, G., Barker, K., & Rosenberg, G., & Onghena, P. (2007). Assessing progress towards accreditation related objectives: Evidence regarding the use of self-efficacy as an outcome in the advanced concentration research curriculum. *Research on Social Work Practice, 17,* 456-465.

Holden, G., Anastas, J., & Meenaghan, T. (2005). EPAS objectives and foundation practice self-efficacy: A replication. *Journal of Social Work Education, 41, 3,* 559-570.

Holden, G., Anastas, J., & Meenaghan, T. (2003). Determining attainment of the EPAS foundation program objectives: Evidence for the use of self-efficacy as an outcome. *Journal of Social Work Education, 39,* 425-440.

Holden, G., Meenaghan, T., Anastas, J. & Metrey, G. (2002). Outcomes of social work education: The case for social work self-efficacy. *Journal of Social Work Education, 38, 1,* 115-133.

Spitzer, W., Holden, G., Cuzzi, L. C., Rutter, S., Chernack, P., & Rosenberg, G. (2001). Edith Abbott was right: Designing fieldwork experiences for contemporary health care practice. *Journal of Social Work Education, 37,* 79-90.

Holden, G., Barker, K., Meenaghan, T. & Rosenberg, G. (1999). Research self-efficacy: A new possibility for educational outcomes assessment. *Journal of Social Work Education*, *3*, 463-476.

Holden, G., Cuzzi, L. C., Rutter, S., Chernack, P., Spitzer, W. & Rosenberg, G. (1997). The Hospital Social Work Self-Efficacy Scale: A partial replication and extension. *Health & Social Work, 22,* 256-263.

Holden, G., Cuzzi, L. C., Rutter, S., Chernack, P., & Rosenberg, G. (1997). The Hospital Social Work Self-Efficacy Scale: A replication. *Research on Social Work Practice, 7,* 490-499.

Cuzzi, L. C., Holden, G., Chernack, P., Rutter, S., & Rosenberg, G. (1997). Evaluating social work field instruction: Rotations versus year-long placements. *Research on Social Work Practice, 7,* 402-414.

Cuzzi, L. C., Holden, G., Rutter, S. Rosenberg, G., & Chernack, P. (1996). A pilot study of fieldwork rotations vs. year long placements for social work students in a public hospital. *Social Work in Health Care*, *24,* 73-91.

Holden, G., Cuzzi, L. C., Rutter, S., Rosenberg, G., & Chernack, P. (1996). The Hospital Social Work Self-Efficacy Scale: Initial development. *Research on Social Work Practice*, *6,* 353-365.

Holden, G. (1991). The relationship of self-efficacy appraisals to subsequent health related outcomes: A meta-analysis. *Social Work in Health Care, 16*, 53-93.

Holden, G., Moncher, M. S., Schinke, S. P., & Barker, K. M. (1990). Self-efficacy of children, and adolescents: A meta-analysis. *Psychological Reports, 66*, 1044-1046.

2. Request the particular scale from me.

3. Draft your research design.

4. Set up a time when I can call and discuss your design with you. I require this as I can usually help folks overcome some of the common obstacles in studies such as these.

5. Cite our work in any reports/articles that you write based on the scale results.

Since you already appear to know something about the RSE – I have attached the article and the scale (the first page is our ID system and is not required). Take a look at these and if you want to use them, figure out your basic design. At that point we could talk via phone as I can relay some of the lessons I learned over the years doing these.

OK?

gary

Professor Gary Holden

New York University

Silver School of Social Work

One Washington Square North

NY, NY US 10003

212.998.5940

[Quoted text hidden]

2 attachments

Research Self-Efficacy scale - pre final.DOC
44K

RSE - jswe 1998.pdf
1225K

APPENDIX D

MENTORSHIP EFFECTIVENESS SCALE

Mentorship Effectiveness Scale

Directions: The purpose of this scale is to evaluate the mentoring characteristics of your advisor, dissertation chair or an individual with whom you have had a professional mentor/mentee relationship during doctoral study. Indicate the extent to which you agree or disagree with each statement listed below. Select the letters that correspond to your response. Use the following scale to rate each statement:

SD = Strongly Disagree; D = Disagree; SLD = Slightly Disagree; SLA = Slightly Agree; A = Agree; SA = Strongly Agree; NA = Not Applicable

SAMPLE: My mentor was hilarious.	SD	D	SLD	SLA	A	SA	NA
1. My mentor was accessible.	SD	D	SLD	SLA	A	SA	NA
2. My mentor demonstrated professional integrity.	SD	D	SLD	SLA	A	SA	NA
3. My mentor demonstrated content expertise in my area of need.	SD	D	SLD	SLA	A	SA	NA
4. My mentor was approachable.	SD	D	SLD	SLA	A	SA	NA
5. My mentor was supportive and encouraging	SD	D	SLD	SLA	A	SA	NA
6. My mentor provided constructive and useful critique of my work.	SD	D	SLD	SLA	A	SA	NA
7. My mentor motivated me to improve my work product.	SD	D	SLD	SLA	A	SA	NA
8. My mentor was helpful in providing direction and guidance on professional issues. (e.g., networking).	SD	D	SLD	SLA	A	SA	NA
9. My mentor answered my questions satisfactorily (e.g., timely response, clear, comprehensive).	SD	D	SLD	SLA	A	SA	NA
10. My mentor acknowledged my contributions appropriately (e.g., committee contributions, awards).	SD	D	SLD	SLA	A	SA	NA

11. My mentor suggested appropriate resources (e.g., experts, electronic contacts, source materials).	SD	D	SLD	SLA	A	SA	NA
12. My mentor challenged me to extend my abilities (e.g., risk taking, try a new professional activity, draft a section of an article).	SD	D	SLD	SLA	A	SA	NA

APPENDIX E

RESEARCH SELF-EFFICACY SCALE

Instructions:

We want to know how confident you are, in your ability to perform specific social work tasks. After you consider each task, please rate your confidence in your ability to perform that task successfully, by **circling** the number from 0 to 100 that best describes your level of confidence. What we mean here by *successfully*, is that *you would be able to perform the specific task* in a manner that a social work supervisor would consider excellent. The phrases above the numbers [*0 = Can not do at all; 50 = Moderately certain can do; and 100 = Certain can do*] are only guides. You can use these numbers or any of the numbers in between to describe your level of confidence. **We want to know *how confident* you are that you could successfully perform these tasks today.**

How confident are you that you can.....	*Cannot do at all*					*Moderately certain can do*					*Certain can do*
a. do effective electronic database searching of the scholarly literature?	0	10	20	30	40	50	60	70	80	90	100
b. use various technological advances effectively in carrying out research (e.g., the Internet)?	0	10	20	30	40	50	60	70	80	90	100
c. review a particular area of social science theory and research, and write a balanced and comprehensive literature review?	0	10	20	30	40	50	60	70	80	90	100
d. formulate a clear research question or testable hypothesis?	0	10	20	30	40	50	60	70	80	90	100
e. choose a research design that will answer a set of research questions and/or test a set of hypotheses about some aspect of practice?	0	10	20	30	40	50	60	70	80	90	100
f. design and implement the best sampling strategy possible for your study of some aspect of practice?	0	10	20	30	40	50	60	70	80	90	100
g. design and implement the best measurement approach possible for your study of some aspect of practice?	0	10	20	30	40	50	60	70	80	90	100
h. design and implement the best data analysis strategy possible for your study of some aspect of practice?	0	10	20	30	40	50	60	70	80	90	100
i. effectively present your study and it's implications?	0	10	20	30	40	50	60	70	80	90	100

APPENDIX F

CONSENT TO ACT AS A HUMAN PARTICIPANT

UNIVERSITYOF NORTH CAROLINA AT GREENSBORO
Please print a copy of this for your records.

CONSENT TO ACT AS A HUMAN PARTICIPANT: Long Form

Project Title: Independent Researcher Identification in Doctoral Students

Project Director: Dr. Deborah J. Taub and Cheryll Albold, M.S.Ed.

Participant's Name:

What is the study about?

This is a research project. The increasing time-to-degree, high attrition in some disciplines, and varying degrees of socialization to scholarship and research, suggest the need for studies that examine the potential contextual and measureable factors which contribute to the successful training, retention, and degree completion of doctoral students in the United States (McAlpine & Norton, 2006). In particular, it may be critical to validate the experiences through which doctoral students are best developed to become scholars and researchers (Boote & Biele, 2005) across different disciplines and identify at which stages of doctoral study it is optimal to provide them. Doing so will help educators to develop a better understanding of how doctoral students gain valuable heuristic knowledge (Padilla, 1999) about how to conduct independent research in their various disciplines and throughout the process of doctoral study (Gardner, 2008a; Lovitts, 2005, 2008).

Despite the emphasis on research in PhD programs, educational professionals have limited understanding of the social and structural components in which strong research interest and identification are meaningfully shaped (Golde & Dore, 2001) and previous findings have been that overall for students "research training is not comprehensive and students are not well informed about all aspects of research" (p. 13). Thus, gaining an understanding of the processes that contribute to the social and cognitive development of an independent researcher in doctoral study may lead to the development of strategies that attenuate ABD and better assist students in completing their degrees.

Why are you asking me?

You have been chosen to participate in this study because you are a current doctoral student, pursuing a doctoral degree in the School of Education.

What will you ask me to do if I agree to be in the study?

You will be asked to complete this online survey about your experiences as a doctoral student pursuing a research-based doctoral degree at UNCG. Questions will be asked relating to mentorship effectiveness, research experiences, research self-efficacy, and degree of personal identification as a researcher and career aspirations in research.

What are the dangers to me?
The risk of identifying something that is hurtful or brings up bad memories for these individuals can cause minimal harm. Participants will be asked to relay information about their educational experience, including their research experience, mentorship effectiveness, research self-efficacy, and degree of personal identification as a researcher and career aspirations in research. Evaluating these factors may cause some minimal discomfort.
If you have any concerns about your rights or how you are being treated please contact Eric Allen in the Office of Research and Compliance at UNCG at (336) 256-1482. Questions about this project or your benefits or risks associated with being in this study can be answered by [Dr. Deborah J. Taub, (336.334.4668, djtaub@uncg.edu) or Cheryll Albold, (336.681-7715, caalbold@uncg.edu).

Are there any benefits to me for taking part in this research study?

There are no direct benefits to you other than having your voice and opinions heard.

Are there any benefits to society as a result of me taking part in this research?

The benefits to society are that this research may be utilized to develop programmatic efforts to improve the experiences of doctoral students in higher education. It may also help to inform policy that needs to be addressed in higher education institutions relating to developing students as academic and professional researchers.

Will I get paid for being in the study? Will it cost me anything?

There are no costs to you or payments made for participating in this study. At the end of the survey you may register separately for a drawing to win one of ten Starbucks Gift Cards valued at $10.00 each.

How will you keep my information confidential?

This survey asks for no personally identifiable information from participants. I will have no way of tying specific responses to an individual. In addition, a web link collector will be used by Qualtrics to distribute this survey. With a web link collector, a web address is generated for the survey that can then be stated in the email that was sent to you. Web link collectors do not collect track email addresses for responses and thus, I as the survey administrator will not be able to link responses back to a specific individual. Qualtrics also has the ability to disable IP collection in their data analysis section, which also removes any information that could be used to tie responses back to a specific individual. By submitting a response to this survey, your consent is implied.

All information obtained in this study is strictly confidential unless disclosure is required by law.

As this research is being conducted over the internet, absolute confidentiality of data provided through the Internet cannot be guaranteed due to the limited protections of Internet access. Please be sure to close your browser when finished so no one will be able to see what you have been doing."

What if I want to leave the study?

You have the right to refuse to participate or to withdraw at any time, without penalty. If you do withdraw, it will not affect you in any way. If you choose to withdraw, you may request that any of your data which has been collected be destroyed unless it is in a de-identifiable state.

What about new information/changes in the study?

If significant new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you.

Voluntary Consent by Participant:

By clicking “yes”, you are consenting and agreeing that you read, or it has been read to you, and you fully understand the contents of this document and are openly willing to consent to take part in this study. All of your questions concerning this study have been answered. By clicking “Yes”, you are certifying that you are 18 years of age or older and are agreeing to participate.

- Yes
- No

APPENDIX G

COMPLETE SURVEY INSTRUMENT

Doctoral Students and Research

The purpose of this dissertation research study is to gain an understanding of the factors that contribute to the social and cognitive development of an independent researcher identification in doctoral students. Please answer all questions as accurately as possible. All answers will be kept confidential and aggregated. Your individual identity cannot be identified.

What is your gender?

- ❍ Male
- ❍ Female
- ❍ Transgender
- ❍ Other (please specify) _____

What is your age?

- ❍ less than 18
- ❍ 18-25
- ❍ 26-35
- ❍ 36-55
- ❍ over 55

Race/Ethnicity

- ❍ White/Caucasian
- ❍ Black/African-American
- ❍ Asian/Pacific Islander
- ❍ Hispanic/Latino
- ❍ Native American
- ❍ Other (please specify) _____

What is your highest prior education level?

- ❍ Bachelors
- ❍ Master's
- ❍ PhD
- ❍ Other (please specify) _____

What is the doctoral degree you are currently seeking?

- ❍ Doctor of Philosophy (PhD)
- ❍ Doctor of Education (EdD)
- ❍ Other (please specify) _____

What is your enrollment status?

- ❍ Part-Time (less than 6 credits per semester)
- ❍ Full-Time (6 credits or more per semester)
- ❍ Dissertation credits only
- ❍ Other (please specify) _____

What is your school of doctoral study at UNCG?

- ❍ Education
- ❍ Other

What is your department of study in the UNCG School of Education?

- ❍ Counseling and Educational Development
- ❍ Educational Leadership and Cultural Foundation
- ❍ Educational Research Methodology
- ❍ Specialized Education Services
- ❍ Teacher Education and Higher Education

What is your area or field of study?

- ❍ Counseling & Counselor Education
- ❍ Educational Leadership
- ❍ Educational Studies (Cultural Studies concentration)
- ❍ Education Research, Measurement, and Evaluation
- ❍ Special Education
- ❍ Educational Studies (Higher Education concentration)
- ❍ Educational Studies (Teacher Education and Development concentration)
- ❍ Other (please specify) _____

What is your amount of doctoral study experience?

- ❍ Less than 1 year
- ❍ 1 year
- ❍ 2 years
- ❍ 3 years
- ❍ 4 years
- ❍ 5 years – 7 years
- ❍ More than 7 years

Where are you currently in your doctoral degree program?

- ❍ Have not completed coursework
- ❍ Coursework completed but not comprehensive examination
- ❍ Comprehensive exam completed but not proposal
- ❍ Proposal completed but not dissertation
- ❍ Working on dissertation
- ❍ Dissertation completed
- ❍ Other (please specify)

What is your employment status?

- ❍ Employed full time (not as graduate assistant)
- ❍ Employed part-time (not as graduate assistant)
- ❍ Employed as graduate assistant
- ❍ Not employed
- ❍ Other (please specify) _____

While working on your doctoral degree, on average how many credit hours did you take per semester?

- ❍ 0 to 1
- ❍ 1 to 3
- ❍ 3 to 6
- ❍ 6 or more

Not counting dissertation, what is the extent of your previous research experience?

- ❍ No previous experience
- ❍ Faculty Research Assistant
- ❍ Lab Assistant
- ❍ Master's Thesis
- ❍ Other (please specify) _____

Mentorship Effectiveness Sub-scale (Berk et al., 2005): The purpose of this sub-scale is to evaluate the mentoring characteristics of your advisor, dissertation chair or an individual with whom you have had a professional mentor/mentee relationship during doctoral study. Indicate the extent to which you agree or disagree with each statement listed below. Select the letters that correspond to your response. Use the following scale to rate each statement: SD = Strongly Disagree; D = Disagree; SLD = Slightly Disagree; SLA = Slightly Agree; A = Agree; SA = Strongly Agree; NA = Not Applicable SAMPLE: My mentor was hilarious. SD D SLD SLA A SA NA

My mentor was accessible.

- ❍ Strongly Disagree
- ❍ Disagree
- ❍ Slightly Disagree
- ❍ Slightly Agree
- ❍ Agree
- ❍ Strongly Agree
- ❍ Not Applicable

My mentor demonstrated professional integrity.

- ❍ Strongly Disagree
- ❍ Disagree
- ❍ Slightly Disagree
- ❍ Slightly Agree
- ❍ Agree
- ❍ Strongly Agree
- ❍ Not Applicable

My mentor demonstrated content expertise in my area of need.

- ❍ Strongly Disagree
- ❍ Disagree
- ❍ Slightly Disagree
- ❍ Slightly Agree
- ❍ Agree
- ❍ Strongly Agree
- ❍ Not Applicable

My mentor was approachable.

- ❍ Strongly Disagree
- ❍ Disagree
- ❍ Slightly Disagree
- ❍ Slightly Agree
- ❍ Agree
- ❍ Strongly Agree
- ❍ Not Applicable

My mentor was supportive and encouraging.

- ❍ Strongly Disagree
- ❍ Disagree
- ❍ Slightly Disagree
- ❍ Slightly Agree
- ❍ Agree
- ❍ Strongly Agree
- ❍ Not Applicable

My mentor provided constructive and useful critiques of my work.

- ❍ Strongly Disagree
- ❍ Disagree
- ❍ Slightly Disagree
- ❍ Slightly Agree
- ❍ Agree
- ❍ Strongly Agree
- ❍ Not Applicable

My mentor motivated me to improve my work product.

- ❍ Strongly Disagree
- ❍ Disagree
- ❍ Slightly Disagree
- ❍ Slightly Agree
- ❍ Agree
- ❍ Strongly Agree
- ❍ Not Applicable

My mentor was helpful in providing direction and guidance on professional issues (e.g., networking).

- ❍ Strongly Disagree
- ❍ Disagree
- ❍ Slightly Disagree
- ❍ Slightly Agree
- ❍ Agree
- ❍ Strongly Agree
- ❍ Not Applicable

My mentor answered my questions satisfactorily (e.g., timely response, clear, comprehensive).

- ❍ Strongly Disagree
- ❍ Disagree
- ❍ Slightly Disagree
- ❍ Slightly Agree
- ❍ Agree
- ❍ Strongly Agree
- ❍ Not Applicable

My mentor acknowledged my contributions appropriately (eg., committee contributions, awards).

- ❍ Strongly Disagree
- ❍ Disagree
- ❍ Slightly Disagree
- ❍ Slightly Agree
- ❍ Agree
- ❍ Strongly Agree
- ❍ Not Applicable

My mentor suggested appropriate resources (e.g., experts, electronic contacts, source materials).

- ❍ Strongly Disagree
- ❍ Disagree
- ❍ Slightly Disagree
- ❍ Slightly Agree
- ❍ Agree
- ❍ Strongly Agree
- ❍ Not Applicable

My mentor suggested challenged me to extend my abilities (e.g., risk taking, try a new professional activity, draft a section of an article).

- ❍ Strongly Disagree
- ❍ Disagree
- ❍ Slightly Disagree
- ❍ Slightly Agree
- ❍ Agree
- ❍ Strongly Agree
- ❍ Not Applicable

Research Self-Efficacy sub-scale (Holden et al., 1999): We want to know how confident you are, in your ability to perform specific research tasks. After you consider each task, please rate your confidence in your ability to perform that task successfully, by sliding the corresponding bar and selecting the number from 0 to 100 that best describes your level of confidence. What we mean here by successfully, is that you would be able to perform the specific task in a manner that would be considered excellent. The phrases above the numbers [0 = cannot do at all; 50 = moderately certain can do; and 100 = certain can do] are only guides. You can use these numbers or any of the numbers in between to describe your level of confidence. We want to know how confident you are that you could successfully perform these tasks today.

How confident are you that you can...

_____ a. do an effective electronic database searching of the scholarly literature?

_____ b. use various technological advances effectively in carrying out research (e.g. the internet)

_____ c. review a particular area of theory and research, and write a balanced and comprehensive literature review?

_____ d. formulate a clear research question or testable hypothesis?

_____ e. choose a research design that will answer a set of research questions and/or test a set of hypotheses about some aspect of practice?

_____ f. design and implement the best sampling strategy possible for your study of some aspect of practice?

_____ g. design and implement the best measurement approach possible for your study of some aspect of practice?

_____ h. design and implement the best data analysis strategy possible four your study of some aspect of practice?

_____ i. effectively present your study and its implications?

Visual Analog sub-scale: Please respond to the statements below based on your experiences as a doctoral student and your level of identification as an academic or professional researcher. Slide the bar to mark on the line somewhere between the left anchor "Does not describe me" and the right anchor "Describes me exactly" to indicate how you are feeling RIGHT NOW. Don't spend too much time on any the items, answer quickly. When you are done click Submit to record your final answer.

RESEARCHER IDENTIFICATION SCALE

I consider myself to be an academic or professional researcher

Describes me exactly_____ _____Does not describe me

RESEARCH CAREER INTEREST SCALE

I plan to pursue a career as an academic or professional researcher

Describes me exactly_____ _____Does not describe me